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PROBLEMS OF EDUCATION IN INDIAN GUATEMALA

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Introduction

Deep in the Highlands of western Guatemala a large Indian population lives out its days in a manner not far removed from that of their aboriginal ancestors. These Indians are descendants of the famous Mayans, a people who created a remarkable culture long before Spanish adventurers had even dreamed that "another world" existed to the west. Archeological evidence has disclosed that the Mayan culture was no longer at its peak when, early in the sixteenth century, Alvarado and his fighting companions brutually conquered the native inhabitants. The sudden impact of a strange, powerful, gold-thirsty group of "superior beings" did much to obliterate the last survivals of Indian grandeur. Since that cataclysmic event the natives have never been able to regain their earlier independence; instead, they have submitted more or less peacefully to the rigid rule of a minority group composed of Spanish-speaking whites. During the four centuries of submission, Indians served their masters in various roles: first as slaves, then as serfs, and finally as free men. Even this freedom, however, requires qualification, for the basic economy of Guatemala (production of coffee) depends on Indian labor, and means have always been devised (by the ruling set) to insure an ever-present supply of such labor.[1]

Indians comprise about two-thirds of the population of Guatemala, and they are differentiated from non-Indians (called "Ladinos") in several important ways: They wear distinctive native dress, speak native dialects almost exclusively, and derive their subsistence chiefly from agriculture. Equally significant is the fact that Indians maintain their ethnic unity to a considerable degree. Ladinos are convinced that they are "naturally superior" to natives by reason of their white blood and therefore destined to rule and entitled to a higher social status as well as the chief economic rewards of labor. In social contacts, politically, and economically, Indians endure the subservient role outwardly complacent. Except for sporadic (but rare) uprisings of insignificant groups, natives have accepted white domination with what appears to be amazing passivity. Yet, strictly speaking, this passivity is not all that it seems at first glance, but is actually a form of resistance highly effective from certain points of view.

The central theme of this passive resistance is an unceasing effort by Indians to have as little to do with Ladinos or Ladino ways as feasible. Native resistance applies in practically every phase of life, but, since the present paper is limited to problems of education, the following discussion deals with the phenomenon of resistance only in so far as it is relevant to the subject-matter at hand. However, though education represents a single phase of the life situation, in it are manifested the essential features of the deep-seated conflict that divides Guatemalan society along racial, political, social, and economic lines.

The primary objectives of this paper may be stated as follows: 1) To present an account of Indian education as developed by the natives themselves, and the system of rural education (called here "white education") provided by the Government of Guatemala; 2) A discussion of the functions the two educational systems are intended to serve, and how far these functions are fulfilled; 3) Suggestions for a program of improvement.

[1] A system of debt-servitude flourished for long, accompanied by all the evils that such conditions generally generate. This was displaced in 1934 by a Vagrancy Law which achieves the same end, namely, an adequate supply of native labor available to work on the all-important coffee plantations. For details of this Law, see *Memoria de la secretaria de gobernación y justicia,* (Tipografia Nacional, Guatemala, 1934), p. 895.

The data used relate to conditions in the village of San Miguel Acatán, located in the Western Highlands of Guatemala. These data were obtained during a stay of approximately ten months in the village (1938–1939). Observations and questionings carried on in several other villages, though less thorough than is to be desired, incline this writer to believe that the situation described for San Miguel Acatán prevails throughout a large part of rural Guatemala.

San Miguel Acatan

The Department of Huehuetenango occupies the northwestern sector of Guatemala, bordering Mexico on the west and north. The village, or municipio,[2] of San Miguel Acatán nestles on a slope of the high Cuchumatan mountain range at an altitude of about 5,200 feet, and it is sixty miles northwest of the capital of the Department, also named Huehuetenango, which is a small urban centre. The journey from the capital to San Miguel Acatán is extremely arduous, for the backbone of the mountain range must be traversed at an altitude of over 12,000 feet and the only means of transportation are horses, mules, and human feet.

Subsistence is derived chiefly from the cultivation of corn, beans, and to a lesser extent, wheat and sugar cane. Labor on coffee plantations enables natives to augment their meagre incomes, as does the production of special crafts' objects. Natives depend on corn and beans for their essential food supply, supplementing these crops with wild herbs gathered from the mountainsides.

San Miguel Acatán is inhabited by 10,800 Indians and 155 Ladinos (23 families). The municipio consists of a village centre called the Pueblo and seven hamlets called Aldeas. The latter are established three to six or more miles from the Pueblo. All the Ladinos and 1390 Indians live in and around the Pueblo, while the remaining inhabitants dwell in the Aldeas[3] or in isolated outlying huts. The Pueblo serves as the focal point of most social, governmental, economic, and religious activities; consequently, natives from the Aldeas visit it continually.

[2] A municipio is a "territorial administrative division". See S. Tax, *"The Municipios of the Midwestern Highlands of Guatemala"*, American Anthropologist, N. S., 39, (1937), p. 425. The words "municipio" and "village" are used interchangeably in this paper.

[3] The seven Aldeas are populated as follows: Coya, 2,025; Yalaj, 1,040; Posa, 1,535; Chimban, 870; Cheche, 1,780; Paiconop, 1,250; and Chenicham, 910

The highest local authority is an Intendente (roughly equivalent to a Mayor of a small United States town), assisted by a Secretary and a large staff of native officials. The Intendente and the Secretary are always Ladinos, and they receive regular wages from the Government, while Indian functionaries serve without pay[4] under legal obligation to perform such service.[5] A few of the higher native officials form a Council that acts as an advisory body to the Intendente (chairman of the Council), particularly in matters relating to Indian problems.

Native Education

Since San Miguel Acatán is an agricultural community, native education consists largely of teachings that enable every male individual to acquire facility in agricultural techniques and to solve problems arising from abnormal climatic or soil or animal conditions. Females must learn to perform tasks traditionally assigned to their sex. Occupational specialization among these Indians is, like in many primitive groups, an insignificant factor, for all inhabitants equip themselves with the knowledge necessary to carry on the essential activities of life, while only a few master, in addition, certain special crafts. These crafts, however, play a minor role in the economic organization of the group.

Division of labor obtains in this village, chiefly on the basis of sex. In agriculture, for example, men do all the preparatory labors (i.e., clearing and burning the fields), the planting, and the weeding. Men, women, and children join in gathering the harvest. Housebuilding and distant trading are male functions, but both sexes participate in the business of the central village market. (Ten-year old youngsters frequently hold tiny places in the marketplace, haggling over prices and disposing of their wares as effectively as adult vendors.) Women take care of household duties (cooking, cleaning, washing, etc.), and fetch water from the village fountain in native jugs. No male Indian would ever do such work. The manufacture of rope is known to all men, while braiding of strips of palmleaf, used in making sombreros, is practised by most women. Incidentally, the

[4] An exception is the native Chief of Police who receives $3.00 per month. This is a local practice, not country-wide.

[5] All adult natives are obliged by law to serve at least two years in municipal office. It is customary to select for this service Indians more or less fluent in the Spanish language.

braided strips are turned over to males to be fashioned into native hats on old-time, hand-worked sewing machines, because machine-work is the function of men.

Children begin to tag along after their parents at an early age (approximately from five to seven); boys with their fathers, girls with mothers. Thus they are able to watch the elders in the performance of daily activities, and gradually, by imitation and parental precept, these children acquire knowledge of the labors they will require later in life. Native learning may therefore be said to derive chiefly from observation, participation, and imitation. A concrete illustration of this learning process will best exhibit its nature. In view of space limitations, the writer has thought it advisable to describe a single technique as an example of the learning process operating among these natives. Since rope-manufacture is mastered by every male Indian, and the process involved is fairly complex and somewhat protracted, a description of this technique (or better, techniques) should provide a satisfactory instance of the general method of native education.

A maguey plant that has long, fleshy, thorn-edged leaves is the source of fibre that furnishes excellent raw material for the production of all kinds of rope and rope-objects. This plant grows abundantly throughout the village, though many households set aside small sections of cultivable land expressly for these plants in order to have a large supply always on hand.

When ready to cut leaves from maguey plants (called *chech* in native dialect), a man, his wife, and their children walk to the place where the plant is found carrying a couple of machetes for use as cutting implements. While the children watch the operation, their parents slice off leaves at the base of the plant and cast these leaves aside. The youngsters retrieve the leaves and pile them up in heaps. When the required quantity has been gathered, the leaves are tied together in bundles by the elders and all trudge back to the house, each one carrying a bundle proportionate to his or her size and strength. The leaves are deposited in front of the entrance to the house, whereupon the cooperation between the two sexes terminates. Henceforth, all labors are the tasks of males.

At the house, father and sons squat down on the ground or on tiny chairs, untie the bundles of leaves and begin slitting and cutting operations. An older son generally wields the bone knife (*p'aj*) specially used to slit *chech* leaves, while the father works with his hands and bare feet. Younger boys occupy themselves in observation and in gathering together slit leaves in numerous bunches of three. First, however, thorns are removed from the leaves either by running the blunt side of the bone knife up and down the thorny edge, or by cutting a thin strip off each leaf along with the thorns. The son who uses the knife places a few leaves on the ground, one on top of another, lays a small stick transversely across the leaves at about their centre and, lifting the upper half of the leaves upward, he cuts each one into numerous thin strips. His foot rests on the stick to keep the leaves in place. The knife is inserted at about the middle of the long axis and swung upward to emerge at the tip of the leaf. These cut leaves are tossed over to the father who proceeds to tear each strip down as far as the base, but not all the way through the leaf. He holds the base of each leaf fast between his feet. Young boys tie cut leaves together into bundles of three, about six inches from the still solid base, using plant strips for the purpose, and lay the bundles aside in piles. Next the bundles are tied together into small and large ones and carried to a shallow part of a nearby river or waterhole.

Before immersing the leaves, father and older sons chop off the solid bases with machetes, toss the leaves over to the boys who batter the leaves into relative softness, using short wooden clubs. The softened leaves are then placed under water in thin layers and weighted down by means of stones and long poles. The *chech* remains under water for two weeks to twenty days, the period varying with the quality of the *chech* and the temperature of the water. When the leaves are finally removed from the water, all male hands pitch in to clean off the mud and dirt that has accumulated. This is first done by hand; then the leaves are slapped against large stones until they are fairly clean and somewhat dry. Frequent dippings in water are part of the cleansing operations to facilitate removal of clinging dirt. Once the *chech* is clean, it is strewn about on the ground to dry in the sun for over half an hour. Then the leaves are carried home, each worker taking a bundle proportionate to his strength.

At home, the *chech* is hung on a rope stretched between two poles and left to dry for nearly one whole day. When completely dry, bundles of *chech* are held in one hand and beaten with a wooden club until the remaining greenish epidermis falls off in shreds. Adult and young men do this work. A clean, whitish mass of fibre is produced which is carefully gleaned of all extraneous particles. This fibre, which was originally pulp of *chech* leaves, is the raw material that is manufactured into thread for rope. Further operations, in which native, wooden, wheel implements are used to twist fibre into thread, are performed by men and older boys.

In all, six operations are necessary to produce rope-thread from the *chech* plant. The first step is done by members of both sexes, adults and children contributing their labors.

Thereafter, the work is handled by males. What is most significant, from the point of view of education, is the fact that boys (and girls, too, for their part of the work) begin to help their elders "make rope" at a very early age, observing every detail of the operations, learning to handle the simpler ones, and thus acquiring in time adequate knowledge of the whole process. The learning process is therefore simple and effective: children observe, participate, and imitate the actions of older people, being slowly inducted through the necessary labors by means of single technical steps that are readily absorbed. A similar learning process obtains for every technique needed to pursue life successfully in San Miguel Acatán (at least from the Indian point of view), be it agricultural, household or special craft work. Though such crafts as weaving and pottery obviously require complex and refined work-methods, the learning process is essentially the same. A novice is taught the special craft step by step until mastery is achieved. The absence of verbal instruction among natives is striking; prolonged and difficult tasks are performed by adults and children with hardly a spoken word of advice or censure uttered. The educational emphasis is clearly on *"seeing and doing"*.

A few remarks concerning apprenticeship are necessary to complete the picture. Though many special crafts are no longer practised in this village, among those still flourishing the most important include the making of sombreros, saddle blankets, pottery, and weaving. Weaving and the manufacture of saddle blankets are done by men; women are the potters. Special crafts are usually learned by children from their parents or other relatives, for crafts persist, to some extent, in family lines.

A system of apprenticeship is available, however, to natives desirous that their children learn extra techniques and who are not equipped to give the instruction themselves. The children are apprenticed to expert craftsmen for a period of time necessary to learn the selected technique. These children spend their days at the house of the expert, but sleep at home. The master's wages vary according to the time devoted to instruction. Learning to weave, for example, requires an apprenticeship of two to three months; the master therefore receives a fee amounting to fifty cents. Sombrero production is learned in a month, the teacher receiving twenty five cents for his pains. Pottery has become quite crude in this village and, since lessons take up only a week or two of the potter's time, a few cents cover fees. An exception is the production of beautiful, red-clay water jugs (called *tinajas*), which calls for a good deal of ability and careful handling. This craft seems to be disappearing from San Miguel Acatán, for only two aged women still occupy themselves in making *tinajas*, and they have had no apprentices for many years. The large part of these jugs are now produced in a nearby village, San Sebastian Coatán, and sold in the marketplace every Sunday.

In the sphere of religion, it is customary for grandparents or other elderly relatives to instruct the young. Prayers are learned by rote, while ritual and ceremonial practices are mastered through constant observation and gradually progressive participation.

White Education

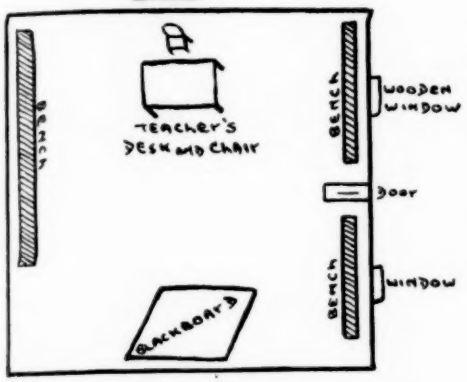
The Government of Guatemala attempted its first broad educational program in 1879, when plans were formulated to establish an efficient system of primary schools to reach the rural areas. A number of village schools have since been operating but much has still to be done before educational facilities will be at the disposal of every child in the country.

Guatemalan law provides for the free, secular, and compulsory education of every child, white or Indian, for a period of three years which must be accomplished before the age of fourteen has been reached. Parents are liable to prosecution if their children fail to attend school. The scattered distribution of natives in Pueblo centres and in Aldeas makes attendance at school contingent on the availability of such schools, a condition recognized by the Government. In San Miguel Acatán, for example, there is a school in the Pueblo centre and one each in two Aldeas, Yalaj and Coya; none of the other five Aldeas have schools. In view of the fact that 6,345 Indians live in these school-less Aldeas, it is evident that large numbers of children lack access to education.

School children are divided by sex in the Pueblo: women teachers instruct girls, men teachers instruct boys, each class occupying separate rooms in a large building. Schools

are co-educational in the Aldeas since only one teacher is assigned, generally a woman. The school in San Miguel Acatán (fairly typical of all village schools) is a rectangular adobe structure with earthen floors and covered by a thatched roof. Each of the three rooms is furnished with long benches standing along the walls, a table and chair for the teacher, and a movable slate blackboard. (See Fig. A)

FIG. A



The school year begins in May and ends in the middle of February. School opens at eight o'clock in the morning, closing at four o'clock in the afternoon. Two hours, from noon to two o'clock, are devoted to lunch, and a recess period lasting about twenty minutes breaks up the long morning session. Classes are held every day except Sunday, but only morning sessions operate on Saturdays.

Children receive small slates and pieces of soft chalk with which to do their lessons. Notebooks, pencils, paper, pen and ink, and similar school supplies are conspicuously absent, the reason being that such objects are far too expensive in Guatemala to be readily acquired by poor inhabitants of rural sections. The Government provides two paper-bound textbooks which contain the bulk of the knowledge children must learn during the three year period at school. Learning by rote is the fundamental educational principle and, in view of the conditions, absolutely unavoidable.

The textbook used in the first year consists of two parts: Part I deals with monosyllabic word-lists and sentences, and numerous pictures illustrate the text. The large part of the information given in Part II is embodied in short stories accompanied by explanatory illustrations and with vocabulary lists appended. This first year book contains seventy four pages in all. The stories cover a wide range of topics, as indicated by the titles of the lessons noted below. Elements of arithmetic are woven into the stories. The textbook for the second and third school years contains one hundred and ninety illustrated pages. A good deal of information is incorporated in the eighty two lessons of this textbook, information varying from exercises in grammar and pronunciation to general science. A characteristic theme found in many story-lessons is the emphasis laid on morally correct behavior. The titles of the lessons that follow immediately disclose this stress on personal virtue and the rewards of good behavior, as well as the ill-fortune that haunts evil actions.

CONTENTS OF THE FIRST YEAR TEXTBOOK

Part I

Nine lessons dealing with monosyllabic words and sentences; this fills nine pages.

Part II

Titles of Lessons

1) Who am I?
2) The spider's web.
3) The bath.
4) Kindness and strawberries.
5) Homophones.
6) Homophones.
7) Exercises.
8) Exercises.
9) As you do, so will be done to you.
10) Who best used his peach?
11) The starling.
12) The drum.
13) Homophones.
14) Exercises.
15) Exercises.
16) The blind hen (Blind Man's Buff).
17) The dolls.
18) The two charitable brothers.
19) How one gets rid of a bad dog.
20) Homophones.
21) Exercises.
22) Exercises.
23) Exercises.
24) Exercises.
25) Punishment of disobedience.
26) Who loves mother?
27) Order and thrift.
28) The water ducks.
29) Homophones.
30) Exercises.
31) Exercises.

Titles of Lessons

32) Do not fear work.
33) Punishment of the glutton and spy.
34) The cautious mouse.
35) Smoke and an evil face drive people from the house.
36) Homophones.
37) Exercises.
38) Exercises.
39) Exercises.
40) Kindness to all beings.
41) The boy who hurt himself.
42) Do not look for a cat with three feet.
43) Return good for evil.
44) Homophones.
45) Exercises.
46) Exercises.
47) No title.
48) A poem.
49) The boys and the playful pony.
50) Soap bubbles and light.
51) A poem.
52) Homophones.
53) Exercises.
54) Exercises.
55) Exercises.
56) Exercises.

CONTENTS OF THE SECOND AND THIRD YEAR TEXTBOOK

Titles of Lessons

1) The teacher's birthday.
2) The lesson.
3) Pronunciation exercises.
4) The birds.
5) Here a cat is hidden.
6) Gases.
7) Gases.
8) Gases.
9) Pronunciation exercises.
10) Exercises in accent.
11) Exercises in accent.
12) Exercises in accent.
13) The sea.
14) The sea.
15) To wish is to be able (a poem).
16) The echo.
17) Pronunciation exercises.
18) Heroism of dogs.
19) Ships.
20) Lighthouses.
21) The shape of the earth.
22) Insurance of ships.
23) Pronunciation exercises.
24) Homophones.
25) Waters—Streams—Springs—Artesian Wells.
26) Waters—Streams—Springs—Artesian Wells.
27) Waters—Streams—Springs—Artesian Wells.
28) Artesian Wells.
29) The donkey.
30) Pronunciation exercises.
31) Lessons on the "h".
32) Lessons on the "h".
33) Painter and cook.

Titles of Lessons

34) Painter and cook.
35) Division of labor.
36) Division of labor.
37) Division of labor.
38) Homophones.
39) On perseverance.
40) The rooster.
41) Pronunciation exercises.
42) The condor (ornith.).
43) The cabbage, the goat, and the wolf. (A riddle.)
44) Volcanoes.
45) Volcanoes.
46) Volcanoes.
47) Volcanoes.
48) Homophones.
49) The lie.
50) Banks—Notes—Credit.
51) Banks—Notes—Credit.
52) I always get the worst end of a deal.
53) Of what flowers remind us.
54) Of what flowers remind us.
55) A story.
56) The cliffs.
57) The cliffs.
58) Pronunciation exercises.
59) Homophones.
60) The swan.
61) Australia and the black swan.
62) The sparrow.
63) Government organization.
64) Government organization.
65) What is valuable to an observer.
66) What is valuable to an observer.
67) What is valuable to an observer.
68) More on the lie.
69) More on perseverance and work.
70) Pronunciation exercises.
71) A story.
72) A story.
73) The comet.
74) The need to pay taxes.
75) Taxes.
76) Homophones.
77) On the accent.
78) Importance of the accent.
79) The work.
80) The work.
81) Economy.
82) The savings box.

First-year, second-year, and third-year pupils occupy the same room, each group seated on a long bench placed against a wall. While the teacher instructs one group, the rest do assigned lessons on their own, generally memory work or writing on slates. In the course of daily instruction the teacher interjects small bits of information not found in the textbooks; these relate to Guatemalan history, geography, arithmetic, etc. One school day follows another in monotonous regularity, slight effort being made to vary the deadening routine throughout the semesters. An example of an average day in school

(witnessed repeatedly by the writer) is as follows:

A few minutes before eight o'clock in the morning a squad of four boys entered the schoolroom to sweep out dirt that had accumulated on the previous day; then they cleaned the front of the school building. (A different squad operates each day of the week.) Meanwhile, the rest of the pupils clustered about near the school waiting for the teacher's signal to enter. These boys, ranging from six to fourteen years of age, formed into a double line and, when the command was given at eight o'clock, they trooped quietly into the schoolroom and sat down at their regular places. The class consisted of twenty eight youngsters.

As soon as they were seated, the boys began whispering among themselves. The teacher, a tall young Ladino, disregarding the hum of subdued voices, walked to the rear blackboard and wrote there several Spanish phrases and sentences. Every pupil had his textbook and slate-board with him, either on the floor or on the knees. When the teacher finished chalking on the blackboard the boys opened their books and began to study.

Once again at his desk, the teacher called boys to him in groups of three to hear them recite their lessons. Each group stood in front of the desk and, in unison, read the same passage from their books, stopping only when the teacher corrected mistakes in pronunciation. As a group finished another was called forward. During these oral lessons the other pupils studied, some muttering aloud to themselves while others wrote on their slates. In an adjoining room, separated by the thinnest of walls, another class was in session, and their loud study raised a constant din in the room. From time to time the teacher was forced to reprimand boys sharply for particularly noisesome study. It was ten o'clock, the hour of recess, when the oral lessons were concluded. This recess, held outside of the building, lasted for nearly twenty minutes, during which time the youngsters scampered busily about playing games.

After recess, the boys were instructed to copy phrases and sentences recorded on the blackboard. Then, one by one, they brought their slates to the teacher, recited aloud what they had written, and received personal correction and instruction in pronunciation and writing from the teacher. This continued until noon, when the two hour lunch period arrived. The afternoon session was devoted to a continuation of the individual lessons, school closing for the day at four o'clock.[6]

Examinations are held at the end of the school year. The Ministry of Education forwards copies of examinations for that year to all teachers, questions being based directly on material covered in the two textbooks. Teachers do not examine their own classes; instead, they receive assignments to test children attending school at villages not too far distant from their own. In Aldeas, however, schools are examined by teachers from the Pueblo of that village. Only male teachers function as examiners, even of girl classes. The village Intendente attends Pueblo school examinations as a regular part of his duties; he is held accountable for the progress (or otherwise) of education in his official domain and is therefore expected to maintain a constant check on the work of teachers.

In examinations children are questioned singly or in groups of four or five. Questions and answers are given orally in the presence of the assembled classes (sometimes boy and girl classes together), the teachers, and the Intendente. Indian children exhibit considerable fright at such times, partly as a consequence of the formal character of examination procedure. The presence of the Intendente, a personage usually held in awe by children, further acts as a disturbing factor.[7]

Educational Function and Achievement

It is scientifically valid to consider the effectiveness of an educational system in terms of the objectives it is intended to attain, provided that a conscious relationship exists between means and ends. A succinct account of the recurrent features that define native and white (i.e., governmental) education in a Guatemalan village has been presented above. Since the two educational systems are clearly intended to serve different functions, it is necessary to state these functions before accurate judgments can be reached regarding success or failure in achievement.

Indian education is essentially of a practical nature and relatively limited in scope. The emphasis rests primarily on the learning of manual techniques that enable individuals to carry on successful existence, and secondarily, though extremely important, on the slow memorization of rituals and prayers necessary to maintain traditional religious practices. Apart from spiritual matters, however, the objectives of native education may

[6] All the pupils except three boys, one of whom was lame, went barefoot. Most were dressed in shirts and either trousers or overalls: underclothes are seldom worn here. Clothing appeared particularly dirty and shabby, with no sign of ever having been pressed.

[7] I witnessed several school examinations in which native children showed obvious fright. They shivered noticeably, and remained mute when question after question was asked.

be phrased as follows: 1) to teach every male to be a competent agriculturist and to equip him with an adequate knowledge of minor, but universally required, techniques (rope-making, housebuilding, etc.), and, as a corollary, to teach every female to be a competent household worker and efficient in required minor techniques; 2) to instruct a few individuals in the special crafts (weaving, pottery, etc.) in order to make available within the limits of the village needed products of these crafts; 3) to inculcate on young minds the traditional mode of Indian life in an effort to preserve the group's ethnic and cultural unity.

In view of these objectives, native education is on the whole successful and, from the Indian standpoint, quite satisfactory, for, by the time children attain maturity, they are well equipped to face and master the special problems that arise in an isolated, agricultural community. The fundamental educational principle in use among natives, namely, "seeing and doing", serves the Indian purpose excellently, since through it manual techniques are easily learned.

The functions of white education are also motivated by practical considerations, but of an entirely different order. School instruction, in a general way, aims at the following: 1) to teach natives the use of Spanish, the national language, so as to facilitate intercommunication between Indians and whites; and 2) to teach them the elements of "reading, writing, and arithmetic".

Achievement varies greatly throughout Guatemala respecting the first-named educational function. In some villages (e.g., Todos Santos, Huehuetenango), the bulk of the male Indian population is fairly fluent in Spanish, while in others (e.g., San Miguel Acatán), only a tiny proportion of native men speak the national language. Indian women universally stick to the native dialects. In any case, Spanish remains a foreign tongue and Indian the familiar medium of communication for the greater part of Guatemala's native population. Even children who manage to learn Spanish comparatively well in the course of three years' study gradually lose this knowledge through disuse in later life, because the native dialect is spoken by them exclusively at home and among their companions.

The factor of language plays another role in the lives of the inhabitants of Guatemala, one which has its inception during the early formative years when children attend school, and which is exceedingly insidious in its influence. As noted above, white children go to school together with natives and, by virtue of their fluency in Spanish, these white youngsters achieve far better grades than is possible to Indians who begin school with hardly any knowledge of the established medium of communication and who must, consequently, spend many months acquiring a new language. Time after time young natives are obliged to repeat a year's study because they are unable to master the knowledge required for promotion. Seldom does this happen to whites. Teachers, therefore, tend to view their native pupils with annoyance, terming them "stupid", "inferior", "brutish", while white pupils, on the other hand, are called "bright", "superior", "genuinely human". Furthermore, the distinction gradually extends to the children themselves, thereby sowing the seeds of racial attitudes that later seem "natural", almost "instinctive". The unfortunate influence of such early school experiences is reflected in the attitude Indians frequently have toward themselves, namely, that they belong to a kind of sub-human species in contrast with "superior" whites with whom they cannot compete favorably in school. These village schools function, in truth, as incubators for the development of harmful attitudes toward "race".

The elements of "reading, writing, and arithmetic" learned at school also fade into the limbo of forgotten things as increasing participation in adult activities, which are chiefly manual, brings about a corresponding decline in the use of knowledge laboriously acquired in the three year school period. In short, the conditions of Indian life are such as to preclude meaningful utilization of scholastic lore.

Forces other than those mentioned above act to nullify constructive educational efforts on the part of the Government. These forces are profoundly significant inasmuch as they reflect one facet of the native reaction to "white ways" and, at the same time, reveal the fundamental schism that separates Indian from white.

Perhaps the greatest obstacle to educational progress is the resistance of native parents to white schooling. This is a phase of the wide-scale passive resistance (mentioned previously) which affects the whole life situation of these natives. It is a fact that only a small proportion of children eligible for school actually comply with the educational law of the land. Hundreds, especially girls, never go to school at all. Regarding the latter, Indians say that they do not care to let their daughters learn "new ways and useless things". Natives give many reasons for keeping their children from school among which the following are probably most common:

1) They do not want their boys to learn to speak, read or write Spanish so that they can avoid conscription in the army, which would force them to leave the village to go to the capital.

2) They do not want their boys to learn to speak, read or write Spanish so that they can avoid serving two years without pay as village officials.

3) They say that teachers "know very little, therefore the children learn practically nothing."

4) They say that children "learn only how to play, to drink liquor, and to have sexual intercourse in school, and that they learn nothing of value because they do not learn how to work."

5) Indians want their children to learn the manual arts necessary to life, and these are not taught at school.

6) They say that they keep their children from school because they want to "maintain their own Indian way of life, and they do not want their children to become like Ladinos."

Arrest and punishment of Indians for infractions of the educational requirement are comparatively rare, for officials are somewhat lax in this respect. Of two hundred and seven cases that were adjudicated in the local court during a period of sixteen months (Jan. 1938–April 1939), only two involved educational delinquencies.

A further hindrance to education, one that affects all school children, is the relative poverty of the country which makes adequate school supplies (books, paper, pencils, ink, etc.) and adequately trained teachers practically impossible in Guatemala. The nation is not industrially advanced and therefore most school articles are imported or produced at high costs, sending prices for these articles far beyond the means of the majority of the inhabitants. The Government is not yet in a position to offer these supplies without cost. Rural teachers become eligible for positions upon completion of a training course that approximates two years of High School education in the United States. Hence, they are for the most part insufficiently prepared to perform teaching tasks made more difficult by the fact that the majority of their pupils know no Spanish. Salaries of teachers in the Department of Huehuetenango are too low to offer an attraction to more energetic and ambitious individuals.[8] This is of course unfortunate, but the Government has not the means whereby teachers could be given extensive training and then establish them in positions paying high wages.

Suggestions for Improvement

Summation with respect to "white education" of Indian children shows that at least five problems confront the Government. These are (1) the obstacle of a language difficulty for natives and teachers; (2) a lack of practical appeal to natives of the subject-matter taught in school; (3) the parental resistance to white schooling; (4) insufficient school supplies; and (5) inadequately trained instructors. Problems (4) and (5) will not be discussed here since their solution depends on an increase in the wealth of the nation, and the Government is slowly, but gradually, making up the deficit, so that the future will in all probability see these difficulties eliminated.

The linguistic problem offers certain difficulties that properly relate to the wider problem of native passive resistance, because the rejection of Spanish as the commonly-spoken tongue in Indian homes and among the natives is a significant part of the whole resistance pattern. It is therefore somewhat futile, under these conditions, to expect native children to be fluent in the language they need when they begin their schoolwork. Unless radical changes in Indian attitudes take place, the burden must fall on the shoulders of school administrators, to be worked out within the limits of existing conditions. The current system, whereby instructors are shifted about from village to village, few remaining in one place long enough to learn the local native dialect, creates insurmountable obstacles even for those teachers interested in helping Indian young-

[8] Teachers salaries throughout the Department range from $10.00 to $17.00 per month.

sters through the medium of their own language.

Since many Ladinos are quite conversant in Indian, particularly in dialects spoken at villages where they were born and raised, it should not prove too difficult to insist on a knowledge of one such dialect as a qualification for teaching positions. As a matter of fact, this writer was acquainted with a number of teachers who spoke Indian well, but in no case were these instructors assigned to villages in which the dialect they knew was used; instead, they taught at schools remotely distant from their own villages. Moreover, some use of Indian dialect in and outside of school by teachers would help break down the hostility that exists between native parents and white instructors.

Native opinion regarding the worth of "things learned at school" is, in certain respects, justifiably reached, for the subject-matter taught appears (to Indians, at least) too far removed from everyday life to warrant expenditure of time and energy. A carefully prepared program of activities that would be relevant to life in an agricultural milieu would certainly attract the interest of most natives, and could provide, at the same time, a basis for interaction between members of the two racial groups that might do much to eliminate cultural discord. Instruction in various planting techniques, for example, or in principles of irrigation or harvesting methods clearly hold genuine appeal to individuals raised in an agricultural environment and destined to spend their lives drawing a livelihood from the soil. Manual arts such as carpentry, painting, and house construction, among others, would undoubtedly prove excellent subjects for inhabitants of backward, rural regions. The more academic subjects need not be sacrificed, but could be woven into the practical courses with little effort and with reasonably adequate results.

The third problem, and probably the most serious of all, is that of parental resistance to educational efforts by the Government. It is not possible, within the scope of the present paper, to enter into the complex causes and consequent effects of the passive resistance to white culture, of which the educational factor is only one phase, which the Indians of Guatemala have developed. Suffice it to say that this resistance is the externalization of a deep-seated mutual antagonism between Indian and white that sprang up and flourished under the severe conditions of conquest and exploitation, and which still persists. Concepts of "racial superiority" and "racial inferiority" hold sway among whites (and occasionally among Indians), causing a division of the population into two separate ethnic and cultural units, a phenomenon that acts as a powerful detrimental mechanism in the development of the nation as a whole.

So long as whites persist in their attitude of superiority and relegate Indians to inferior social and cultural roles, it is to be expected that the latter will be driven deeper into themselves, a process that has been going on practically unabated since the original conquest. A thorough program embracing social, political, and economic reforms must come into being if the welfare of the country is the prime consideration. It is obviously idle to speak of concrete, lasting material and cultural advances in Guatemala unless the Indian group can be influenced, for this group constitutes at least two thirds of the entire population.

A necessary condition for this kind of program is the prosecution of extensive researches among the various local Indian groups spread over the country with a view to learning the cultures in which they function. Armed with such knowledge, the Government could create the machinery for a vigorous application of a long-time program that would have an excellent chance of establishing harmonious and mutually-profitable relations between the two racial divisions. It is only when this form of approach, which may be termed the *anthropological approach*, takes effect in problems involving conflicting racial and cultural groups that leaps in progress can be expected in all phases of life, including education.

STUDIES OF ELEMENTARY SCHOOL CLASSES IN ACTION

I. A Comparative Study of the Daily Occupations of Pupils in "Activity" and "Non-Activity" Schools

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This paper reports results obtained in one of two special studies that were conducted in connection with a series of investigations designed to evaluate the "activity program" in the New York City Elementary Public Schools.* This educational experiment has been described in several earlier publications.** The experiment involved the introduction of newer, "progressive" educational procedures into a sampling of about seventy New York City elementary schools. As a part of the evaluation project, numerous studies have been made, or are still in progress, in which various research procedures have similarly been applied to "activity" schools and to paired "control" schools that have adhered to more traditional practices (or at least have not officially adopted the "activity" program).

The study here reported was conducted in a limited sampling of classes belonging to four pairs of schools, located in four of the five boroughs of New York. Each pair included an "activity" and a "control" school.

The first of the two investigations was designed as a comparative study of what actually was happening in the various classes from the time when the children arrived in the morning until they left in the afternoon.† This study is entitled, "The Working Day in Activity and Non-Activity Schools." The method of direct observation was used to obtain a record of the various projects and activities with which the class as a whole, or individuals or groups within the class, were occupied during the school day, together with a record of the amount of time devoted to each occupation.

The second of the two investigations which will be presented in a later paper deals, in greater detail, with the extent and nature of participation by individual pupils in the activities of the class, and with aspects of the relationships between the pupils and their teachers.

This study was planned to fill many needs. Earlier studies have shown many differences between the activity and control schools with respect to certain categories of pupil behavior. In earlier studies, also, there has been applied an instrument that was designed to measure the extent to which various practices of a presumably progressive nature prevailed in the activity as compared with the control schools. In connection with the study referred to above, however, it was apparent that none of the techniques that had been employed actually gave an adequate answer to rather simple questions such as: What happens during the school day? What projects or occupations are introduced, and how much time is spent on each?

Answers to these questions are of interest not only by virtue of the information they provide concerning differences and similarities between the two educational programs, but also by virtue of the fact that such information is more or less essential for the interpretation of data obtained in other studies in

* The evaluation was conducted with the aid of workers of the Work Projects Administration, Research and Records Program District Office, Research Survey and Federal Data Section, Official Project No. 65–1–97–21 WP 10 Sub 1.

** See, e.g., Jersild, Thorndike, Goldman and Loftus. "An Evaluation of Aspects of the Activity Program in New York City Public Elementary Schools," *Journal of Experimental Education*, VIII (December, 1939), pp. 166–207, and references there made to earlier publications; see also Loftus, John J. "New York City's Large-Scale Experimentation with an Activity Program: A Metropolitan School System Takes Stock." *Progressive Education* (February, 1940), pp. 116–124.

† The authors gratefully acknowledge the helpfulness shown by the principals and teachers in the schools included in this study, and the conscientious services rendered by the workers who observed in the classrooms.

which outcomes in the activity and control schools are compared. For example, the two types of schools have been compared with respect to scores on certain tests including standard achievement tests, covering subjects such as arithmetic, spelling, and the like. In connection with such comparisons, it is pertinent to consider the scores in relation to the amount of time systematically devoted to these various skills. If, as has been found to date, the pupils in classes that are operated along conventional or traditional lines earn somewhat higher average scores on arithmetic reasoning and computation than do the children in activity classes, it is instructive to know whether the control pupils have spent more time on arithmetic, at the expense of other occupations.*

Again, as was pointed out in the earlier study, it appeared from general observation that the activity pupils devoted conspicuously more time to certain occupations, notably projects involving arts and crafts, than did the controls. To the extent that such differences prevail, records such as those undertaken in this study serve a two-fold purpose; first, they provide information as to how much time pupils in selected schools actually spend on such "other" activities, and, secondly, they might indicate areas of learning and experience which cannot be tapped by paper-and-pencil achievement tests, and which should be appraised by some other means.

As a further consideration, it was also thought that a study such as this might throw some light upon the extent to which practices that presumably are of an "activity" rather than of a conventional character have been introduced by non-activity schools. On this point it may be said that one of the difficulties encountered in the earlier study was that some of the classes that were chosen to represent the non-activity group actually were not "pure" controls, for they had gradually adopted, to a greater or lesser extent, certain "activity" practices.

Methods and Population Studied

In this part of the study, each observer, on four different days, distributed over a period of four weeks or more, spent the entire day with a class, and recorded what was going on. Four observers took part in this study. Each of these observers visited three activity classes in a given school, and three control classes in another school, so that the population in this part of the investigation was 12 classes in each of four pairs of schools, or a total of 24 classes.

The classes were distributed as follows:

School Year	Activity Classes	Control Classes
1	3	3
2	1	1
3	2	2
4	2	2
5	2	2
6	2	2

The observers made a running record of the work that was under way. The design in these records was primarily to provide a description on the basis of which the items of school work could be classified. A record was also made of the time involved. If the entire class was occupied on one project, the record so indicated; if the children worked in separate groups, on different activities, note was made of the various group activities that were under way, and of their duration.

The scheme used in classifying the projects and activities embraced in the "working day" is shown below. This classification was devised empirically, on the basis of preliminary classification of records of several days.

Categories Used in Classifying and Tabulating the Data of the "Working Day"

I. Arithmetic (includes exercises, drills, problems, learning to count and to recognize numbers and symbols)
II. Formal Reading and Reading Skills (actual practice in reading and discussions of word meaning in the text—do not include time spent in reading when the actual lesson is history, civics, etc.—Not to be confused with story reading by teacher or pupil for relaxation)
III. Spelling
IV. Penmanship
V. English
    1. Composition
        a. oral
        b. written
    2. Language usage and punctuation
    3. Word study (meanings, derivations)
    4. Speech and pronunciation
    5. Class publications

* The finding that the controls somewhat surpassed activity classes in the conventional "tool" subjects appeared in comparisons that are reported in the article cited above. These results are not final, however, and more precise comparisons are now being made under the direction of Dr. Saul Sells.

6. Appreciation of literature
7. Book reports
   a. oral
   b. written

VI. History

VIx. History and Geography Combined (regional or racial facts, customs, characteristics, attributes, etc.)

VII. Geography

VIII. Civic affairs, current events

IX. Nature Study and Natural Science

X. Topics relating to industry, agriculture, trade and currency, housing, transportation, communication, and consumer knowledge

XI. General Information
1. "Show and Tell"
2. Hobbies (Toy library—arranging stamp collections, etc.)
3. Miscellaneous knowledge and anecdotes
4. Biographies

XII. Art
1. Drawing and painting
2. Modeling and pottery
3. Appreciation of art and architecture

XIII. Crafts
1. Carpentry and wood-working, carving, etc., metal work
2. Needlework and weaving
3. Miscellaneous construction (maps, slides, scrapbooks, puppets, etc.)

XIV. Technical Skills
1. Typewriting
2. Projection machine operation
3. Miscellaneous (wigwam construction, etc.)
4. Using telephone
5. Gardening

XV. Physical Training
1. Motor exercises (including rest and relaxation according to a specific instruction)
2. Games
3. Dancing
4. Rhythms
5. Athletic skills

XVI. Music
1. Appreciation
2. Singing (group or individual)
3. Technical knowledge

XVII. Recitations, dramatics, choral speaking, etc.

XVIII. Research and Study Techniques
1. Use of reference books
2. Use of libraries
3. Making a dictionary, making notebooks on special subjects
4. Collecting or making quiz questions
5. Study period (homework)

XIX. Health and Hygiene
1. Class inspection (eye testing, weighing, measuring, showers)
2. Health knowledge

XX. Conduct and Manners
1. Specific to individual (reprimands)
2. Specific to group (reprimands)
3. General: proverbs pertaining to conduct and manners, poems, homilies, admonitions
. Busy work or silence period as punishment

XXI. Patriotism and Religion (pledge of allegiance to flag; Bible reading in class assembly)

XXII. Class Organization
1. Appointments and elections
2. Meetings and discussions (about individual pupils and their relation to the group to work)

XXIII. Work Organization
1. General homework check-ups (report cards, gold stars, pictures, awards)
2. Assignments, planning or discussions of work or schedules (in relation to future or past work rather than the present), log report
3. Progressive instructional tests (when on several subjects—when one subject only is covered, tally under that subject)

XXIV. Routine Activities
1. Roll call
2. Donning or doffing wraps
3. Changing classrooms or leaving for home
4. Drinking or toileting
5. Distributing, preparing, changing or putting away papers, books, materials; straightening up the room, collecting money, etc.
6. Miscellaneous monitor duties
7. Official announcements
8. Waiting at attention
9. Fire drill

XXV. Relaxation, Pastime or Social Activities
1. Refreshments (milk and crackers)
2. Story telling or reading
3. Games (amusement or parlor games rather than gymnasium (X_3) or educational games (V_3))
4. Conversation, play or informal rest

XXVI. Miscellaneous items (not classified in other categories)

XXVII. Assembly

The findings obtained in these observations are shown in Tables I, II, and III.

Tables I and II show a number of differences between activity and control classes. Some of these differences are quite conspicuous.

In the control classes, 93% of the time was spent on occupations involving the class as a

TABLE I

RESULTS OF THE "WORKING DAY" OBSERVATIONS, SHOWING THE PERCENT OF TOTAL TIME DEVOTED TO VARIOUS SUBJECTS, SKILLS AND PROJECTS IN 12 ACTIVITY AND 12 CONTROL CLASSROOMS DURING A PERIOD OF FOUR SCHOOL DAYS

	Activity	Control
Total hours of observation	218.7	213.53
Total time (hours) spent on projects occupying the class as a whole	183.1	198.18
Total time (hours) spent on 2 or more group projects	35.6	15.35

Occupation	Activity A Whole Class	Activity B Sub-Group	Activity A+B	Control A Whole Class	Control B Sub-Group	Control A+B
Arithmetic; exercises; drills; counting, etc.	11.19	3.10	14.29	12.77	1.82	14.59
Reading (as such, not incidental to history, geography, etc., or reading for relaxation)	7.88	4.91	12.79	12.11	2.16	14.27
Spelling	4.01	.84	4.85	6.03	.27	6.30
Penmanship exercises	.43	.40	.83	4.18		4.18
English: language usage; oral and written composition; word study; pronunciation; class newspaper work; book reports; appreciation of literature, etc.	5.72	3.68	9.40	8.27		8.27
History	3.03	1.21	4.24	3.56		3.56
History and Geography combined	.30		.30	.37		.37
Geography	4.34	1.52	5.86	4.29	.16	4.45
Current events and civic affairs	1.34		1.34	1.01	.12	1.13
Conduct and Manners: specific to individual (reprimands); specific to group (reprimands); general (proverbs, [pertaining to conduct and manners] poems, homilies); admonitions	1.37		1.37	1.16	.001	1.161
Topics relating to agriculture; industry, trade and currency; housing; transportation; consumer knowledge; communication	.66	.50	1.16	.92	.19	1.11
Nature study and natural science	1.87	.30	2.17	1.88	.87	2.75
General Information: "show and tell;" hobbies (toy library—arranging stamp collections, etc.); miscellaneous knowledge and anecdotes; biographies	4.02	.37	4.39	2.41	.27	2.68
Art: drawing and painting; modeling and pottery; appreciation of art and architecture	2.48	9.69	12.17	1.99	2.21	4.20
Crafts: carpentry and wood-working; needlework and weaving; miscellaneous construction (maps, slides, scrapbooks, puppets, etc.)	2.23	7.81	10.04	.07	1.62	1.69
Technical Skills: typewriting; projection machine operation; miscellaneous (wigwam construction, etc.); using telephone; gardening	.40		.40	.31	.27	.58
Physical Training and Exercises: (rest and relaxation); games; dancing; rhythms; athletic skills	4.09	1.45	5.54	4.56	.56	5.12
Music and Singing: appreciation; singing (group or individual); technical knowledge	1.68	.43	2.11	.62	2.33	2.95
Recitation, Poetry and Dramatics; diction—speech correction, etc.; acting	2.27	.64	2.91	1.40		1.40
Research and Study Techniques: use of reference books; use of libraries; making a dictionary; making notebooks on special subjects; collecting or making quiz questions; study period (homework)	1.49	2.00	3.49	1.75	1.15	2.90
Health and Hygiene: class inspection (eye testing, weighing, measuring, showers); health knowledge	.95	.08	1.03	.73	.15	.88
Patriotism, Ethics: Bible reading in class assembly; pledge to the flag, American creed	.12		.12	.27		.27
Class Organization: appointments and elections; meetings and discussions (about individual pupils and their relation to the group or to work)	.66	.08	.74	.27		.27

TABLE I (continued)

RESULTS OF THE "WORKING DAY" OBSERVATIONS, SHOWING THE PERCENT OF TOTAL TIME DEVOTED TO VARIOUS SUBJECTS, SKILLS AND PROJECTS IN 12 ACTIVITY AND 12 CONTROL CLASSROOMS DURING A PERIOD OF FOUR SCHOOL DAYS

Occupation	Activity			Control		
	A Whole Class	B Sub-Group	A+B	A Whole Class	B Sub-Group	A+B
Work Organization: general homework check-ups (report cards, gold stars, pictures, awards); assignments, planning or discussions of work or schedules (in relation to future or past work rather than the present), log report; progressive instructional tests (when on several subjects—when on one subject only is covered, tally under that subject)	2.52	.28	2.80	2.42	.21	2.63
Routine Activities: roll call; donning or doffing wraps; changing classrooms or leaving for home; drinking or toileting; distributing, preparing, changing or putting away papers, books, materials; straightening up the room, collecting money, etc.; miscellaneous monitor duties; official announcements; waiting at attention; fire drill	12.08	.38	12.46	15.04	.44	15.48
Relaxation and Social Activities: refreshments (milk and crackers); story telling or reading; games (amusement or parlor games rather than gymnasium or educational games); conversation or play or informal rest	1.75	.44	2.19	2.32	.10	2.42
Miscellaneous (not otherwise classifiable)	.73		.73	.07		.07
Assembly	4.12		4.12	2.04		2.04

whole; the corresponding percentage in the case of the activity classes was 84%. The difference here is not as large as one might expect in view of the fact that the programs presumably are quite different, nor is it as large, perhaps, as might be estimated by an observer after an informal visit to the two types of classrooms. However, these percentages do not adequately reflect the differences that may prevail. It may be mentioned, for example, that in many activity classrooms there is a good deal of flexibility, collaboration between small groups of children, activity of committee members and the like, that may occur when all members of the class are similarly occupied on the same general project. Such differences are not fully reflected in the tables.

It can be noted that the time spent by the class as a whole in the control schools on more or less formal subject matter considerably exceeds the time spent on the same subjects by the activity classes. However, when account is taken of the time spent by smaller groups within the class on such subjects, the total amount of time during which some or all of the class are occupied on subjects such as arithmetic, reading and spelling is more nearly the same in activity and control classes. The most notable difference occurs in the case of formal penmanship exercises. 4.08% of the time in the control classes is devoted to penmanship exercises, as against less than 1% of the time in the activity classes.*

About the same amount of time was spent on what might be called social science (history, geography, and civic and economic affairs). The time devoted by part or all of the activity classes to these subjects slightly exceeded the time so spent by the control classes.

The enterprises to which the activity classes devoted considerably more time than the controls include the following (the values cited in the following are based upon results for all classes combined, in each of the two groups): a category including "general in-

* On the basis of superficial observation in the classroom, it appears that the time spent on formal penmanship drills is largely a waste as far as many pupils are concerned. Observers have noted, for example, that there often is little or no obvious relationship between the formal penmanship exercises and the manner in which children write at other times. Sometimes, also, it seems that the teachers themselves have a difficult time in giving just the proper "oomph" to the tail of the "g", or the loop of an "l". It seems also that a good deal of time is required for the children simply to learn the mechanics of the exercises (such as the technique of constructing wheels with alternating clockwise and counter-clockwise strokes of the pen.)

TABLE II

PER CENT OF TIME SPENT BY (A) THE CLASS AS A WHOLE OR BY (B) ONE OR MORE GROUPS WITHIN THE CLASS ON VARIOUS OCCUPATIONS, GROUPED UNDER LARGER HEADINGS (OMITTING CERTAIN MINOR CATEGORIES)

Occupation	Activity			Control		
	A Whole Class	B Sub-Group	A+B	A Whole Class	B Sub-Group	A+B
Arithmetic, reading, spelling, penmanship, English exercises and composition	29.23	12.93	42.16	43.36	4.25	47.61
History, geography, civic and economic affairs	9.67	3.23	12.90	10.15	.47	10.62
Science and health	2.82	.38	3.20	2.61	1.02	3.63
General information, hobbies, biography, etc.	4.02	.37	4.39	2.41	.27	2.68
Arts and crafts, technical skills, music, dramatics, poetry, etc.	9.06	18.57	27.63	4.39	6.43	10.82
Relaxation, social activities, refreshments	1.75	.44	2.19	2.32	.10	2.42
Physical training; games, athletic skills, rhythms, etc.	4.09	1.45	5.54	4.56	.56	5.12
"Research" and study techniques	1.49	2.00	3.49	1.75	1.15	2.90
Instruction in conduct, manners; ethics; religious readings and patriotic exercises, etc.	1.49		1.49	1.43	.001	1.43
Class and work organization, planning; elections, etc.	3.18	.36	3.54	2.69	.21	2.90
Routine activities, roll call, distributing papers, etc.; standing in line, etc.	12.08	.38	12.46	15.04	.44	15.48
Assembly	4.12		4.12	2.04		2.04

formation", "show and tell", discussion of or work with hobbies, etc. (respectively 4.39 and 2.68 percent of the time in activity and control groups); art, including drawing, painting, modeling, art appreciation (12.17 as against 4.2 percent); crafts, including carpentry, wood-working, needlework, metal work, construction of maps, slides, binders, etc. (10.04 as against 1.69 percent); poetry, dramatics and recitations (2.91 as against 1.40 percent).

The activity groups also spent somewhat more time than did the controls on research and study techniques, including use of libraries, dictionary, making quiz questions, etc. (3.49 as against 2.90 percent). The activity groups likewise spent somewhat more time on history, geography, and topics relating to civic and economic affairs (12.90 as against 10.62 percent).*

Several enterprises occupied about the same amount of time in the two groups, including nature study and natural science, physical training, dancing, physical exercises, etc.; health and hygiene.

The category "routine activities" including roll call, donning and doffing wraps, standing in line, putting things away or distributing them, etc., took 12.08 percent of the time of the class as a whole in the activity group and 15.48 percent in the control group. The time so spent by the activity group, it can be noted, is somewhat less than in the control group, but it is noteworthy that so large a proportion of the working day in both groups is consumed by these routine activities.

In the treatment of the results, separate tabulations were made of the results at various grade levels. These tables are not here reproduced.

They show that more time was spent on projects that occupy the entire class, as distinguished from separate groups within the class, at every grade level. It likewise appeared that the results for the separate grade levels generally conform to the results for all grades combined, as shown in Table I.

At each of the grade levels, the control groups spent more time on arithmetic projects that involved the entire class than did the activity groups. In both groups there was an increase in the percent of time devoted to arithmetic from grade I to grades III and IV, and a decline in grades V and VI.

Reading lessons that involved the entire class consumed more time in control than in activity classes from the first through the fourth grades. Both groups showed a decided drop in the amount of time spent on reading lessons, as such, at the fifth and sixth grade levels as compared with earlier grades, but the activity children devoted relatively more time to reading lessons than did the controls

* Unless otherwise stated, the values here cited represent the total of time spent by the class as a whole or by a part of the class.

at the fifth and sixth grade levels. At all levels, the controls devoted conspicuously more time to formal penmanship drills than did the activity children. (Incidentally, in view of the relatively large investment of time in such drills, it would be interesting to have ratings of the penmanship of the pupils in the two groups. Systematic ratings of this performance have not, as far the writer knows, been obtained in any part of the evaluation program of which this study is a part.)

At all grade levels, more time was devoted by the activity pupils than by the controls to art work. However, at three of the four levels represented in the tabulations, the controls spent more time on music.

It is interesting to note, in passing, that the amount of time absorbed by routine activities, such as standing in line, distributing or collecting papers, etc., represents a rather large percentage at all grade levels, and shows no marked tendency to decline in the upper as compared with the lower grades.

Discussion

The findings obtained by means of the "Working Day" observations provide, as noted above, an objective statement of certain differences between the two educational programs. These findings are instructive in themselves and they also have implications for further study. A repetition of similar observations from time to time would provide a relatively convenient means of tracing, in objective terms, changes or developments that may have taken place, at least in the externals of the program, from time to time. Supplementary observations might also be made to provide a more intensive analysis of ways in which materials from various subject-matter areas are integrated.

The findings also have implications with respect to the larger program of evaluation. In measurements of achievement in the academic subjects, for example, it would be appropriate not merely to compare the averages obtained by pupils in the two groups of schools but also to consider these averages in terms of the amount of time spent by the children on the various subject-matter skills that are measured. If, for example, such measurements should show that the control pupils are somewhat superior in formal spelling exercises, it would be interesting to note whether this difference is commensurate with the differences in amount of time spent by the two groups on spelling. Again, if it were found that the two groups are approximately equal in achievement in a given subject, even though one of the two groups spends less time on that subject than does the other, such a finding would obviously have practical implications. It would suggest, among other things, that academic gains seem to arise in part as a by-product of other learnings and that the time specifically devoted to a subject matter as such might well be reduced.

The findings also definitely indicate that a thorough-going measurement of the attainments of the two groups would require tests not only of the conventional academic skills but also an appraisal of the learnings that the pupils acquire in areas that are stressed to a greater extent in one of the groups than in the other. The fact, for example, that the activity children spend considerably more time than do the control children upon arts, crafts and dramatics indicates the need for more systematic measurement of the benefits which they may have derived from the time so spent. It is possible that these benefits might be more valuable and might out-weigh the advantages, if any, that might accrue to the other children who spend more time on the conventional academic subjects.

The findings here reported, combined with findings obtained in other investigations belonging to the evaluation project of which this study is a part, may reasonably be interpreted as being favorable to the activity program. As already noted, the present findings indicate that pupils in activity schools spend somewhat less time on the conventional academic subjects and devote more time to arts, crafts and certain other enterprises. Quite apart from the question as to what benefits the children receive from the time spent on these latter activities, the question may be raised, how do they compare with the control pupils in achievement in the conventional subject-matter skills, and in other tests of intellectual competence? Comparisons between the scores of activity and control pupils on the Modern School Achievement test give a partial answer, as do the results obtained on a series of tests devised by Wrightstone. Reports of findings obtained in various series of tests are reported in separate articles in this number of the *Journal*.

The available results indicate that while the pupils in non-activity classes tend, if anything, to surpass activity children in standardized tests of these subject-matter skills, the differences are neither consistently large nor are they consistently statistically significant. Moreover, the activity children, in most comparisons earned higher average scores in a series of tests in the social studies and the natural sciences. Added to this there are two points of credit for the activity pupils. To the extent that the sampling of classes included in the present study may be regarded as representative, it appears that the activity children, while spending less time on conventional subject-matter skills, almost keep the pace in these skills with non-activity pupils. Second, while thus advancing at practically a normal rate in their subject-matter skills, the activity pupils are having the opportunity of obtaining such benefits as accrue from giving a considerably greater amount of time than the non-activity pupils to other enterprises, including arts, independent study, work in the crafts, dramatics, oral composition, and the like.

A FURTHER COMPARISON OF PUPILS IN "ACTIVITY" AND "NON-ACTIVITY" SCHOOLS

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The findings reported in this paper supplement results that were reviewed in a section of an article published in this *Journal* in December, 1939.* Since the date of that publication, which dealt with findings of an evaluation of newer educational procedures in the New York City elementary schools, the evaluation project** has been continued along various lines. One of the several methods of measurement that have been used consists of a series of tests designed to measure "critical thinking" in the social studies, knowledge of current affairs, social beliefs and attitudes, and personality adjustment. These tests were devised by Wrightstone. Since the time of the report mentioned above, the series has been augmented by tests relating to the natural sciences, including tests of "Working Skills," "Explaining Facts," "Applying Generalizations," and a test of "What Do You Believe?" in the natural sciences. The latter tests have been constructed by Goldman and Wrightstone and their associates.

All of the tests, with the exception of those relating to the natural sciences, have been described in earlier publications. A brief account of the latter follows.

Working Skills in the Natural Sciences. This test, like its companion test in the social studies, consists of three parts: The first requires the pupil to extract information from paragraphs, tables, and diagrams; the second requires the pupil to tell where to locate certain types of information in the natural sciences; the third requires the pupil to use an index. It is assumed that these performances are a measure of desirable abilities involved in the location and utilization of necessary information in the field of natural science.

A sample table from the test is given below:

ABSENCE OF SCHOOL CHILDREN DUE TO COLDS

	Dec.	Jan.	Feb.	Mar.	Apr.
Boys -----	15%	13%	12%	12%	8%
Girls -----	9%	5%	7%	4%	6%

1. Which group has more colds from Dec. through Feb.? (a) Boys, (b) Girls____( )
2. In what month are there least absences due to colds among the boys? (a) January, (b) February, (c) April _____( )
3. In what month are there most absences due to colds? (a) March, (b) January, (c) December _____( )
4. During which month were 95% of the girls present? (a) April, (b) December, (c) January _____( )

Explaining Facts in the Natural Sciences. This test requires the pupil to judge whether certain inferences do or do not follow from given data in the natural sciences. No recall of facts is required, because all the necessary evidence is contained in material which is available to the student. His task is one of comprehension, inference and judgment.

The evidence upon which the pupil must base his inference is tabular, and graphical in some cases. In other cases it is verbal exposition. A representative sample of the latter would be this passage:

> In making a garden, spade the soil until the earth is thoroughly broken up and loosened. Spading is very important because, (1) it makes it easier for the roots of the plants to grow deep in the soil; (2) it allows the air to enter the soil; (3) it keeps water from running off the soil; (4) it gives the plants a chance to get started before the weeds begin to grow.

* Jersild, A T., Thorndike, R. L., Goldman, Bernard, and Loftus, John J. "An Evaluation of Aspects of the Activity Program in the New York City Public Elementary Schools," *Journal of Experimental Education*, VIII (December, 1939), pp. 166–207. Other articles relating directly or indirectly to this study are listed at the end of this article.

** The evaluation was conducted with the aid of workers of the Works Projects Administration, Research and Records Programs District Office, Research Survey and Federal Data Section, Official Project No. 65–1–97–21 W.P. 10, Sub. 1.

The pupil indicates his judgment of certain interpretations of the material presented by marking the interpretations as follows:

(+) Every statement which is true and can be proved by the facts stated.
(O) Every statement which might be true but cannot be proved by the facts stated.
(—) Every statement which is false as shown by the facts stated.

The interpretations offered for the paragraph cited above, and the marking which would give a pupil a perfect score are as follows:

1. It is easier for plants to grow in broken up and loosened ground ---------- (+)
2. Ground that is loosened and broken up drinks in the water better ---------- (+)
3. No air can go beneath the surface of the ground ---------- (—)
4. It is easier for chickens to find harmful bugs and worms when the soil is spaded (O)
5. Sandy ground which is well watered makes a good soil in which to grow vegetables ---------- (O)

Applying Generalizations in the Natural Sciences. In this test the pupil was presented with a paragraph followed by 7 generalizations some of which had something to do with what was said in the paragraph and some of which had nothing to do with the paragraph. The pupil marked with a plus (+) each statement which was clearly true in the light of what was said in the paragraph, and marked with a minus (—) each statement which had nothing to do with what was said in the paragraph. A sample from this test with the appropriate markings is given below:

Your body needs food just as a machine needs fuel. The principal elements in food are carbon, hydrogen, oxygen, nitrogen, and sulphur. In addition to these elements, calcium and phosphorus are necessary to build bones and teeth. Your body needs minerals, proteins, and carbohydrates in order for you to work, play, and move about. Vitamins C and D, which are substances found in such foods as oranges and cod liver oil, are needed to prevent certain diseases like scurvy and rickets. Heat destroys many vitamins.

1. Regular physical and dental examinations are necessary to safeguard health_(—)
2. People need more food when they are working than when they are sleeping__(—)
3. It is possible to eat plenty of food and yet have weak bones ---------- (+)
4. Milk is a food which contains many of the necessary food elements ---------- (—)
5. Water is necessary to digest food_____(—)
6. People could have healthier bodies if they knew more about how to choose their diet ---------- (+)
7. Food that contains minerals helps produce healthy bodies ---------- (+)

What Do You Believe? in the Natural Sciences. In this test the pupil is required to mark as true or false a number of statements of fact and superstition. The following is a representative sample of the statements along with the correct markings:

Wind and rain wear away rocks_____(+)
Beauty and brains seldom come together_(—)
Good people die young ---------- (—)
Some stars are much larger than the sun_(+)
Diamonds and coal are made of the same substance ---------- (+)
A four-leaf clover brings good luck_____(—)

Subjects

The pupils who were tested included children in "activity" schools (schools that had officially adopted a program involving newer or more progressive educational procedures), and children in "non-activity" schools (schools that did not officially participate in the experiment with newer educational procedures and thus served as controls).

Differences in the practices of the two groups of schools, and comparisons based upon systematic observation of various activities and performances in selected schools, have been reported in earlier studies and are further treated in more recent investigations that, as yet, are unpublished, some of which are listed in the bibliography. All the various lines of study indicate that, in the aggregate, there are notable differences in the procedures in the two schools of the two groups. Among other matters, the pupils in activity classes show a higher average frequency of behavior under such headings as self-initiated activity, leadership, critical activities, experimental activities. In activity classes, likewise, there is relatively less time spent in recitational activities and relatively more time spent on discussion; more opportunity is provided for activities involving individuals or committees as distinguished from projects on which the entire class is engaged at one time. The activity classes likewise devote somewhat less time to conventional subject-matter skills and considerably more time to arts, crafts, and the like. Needless to say, there are wide differences between the operations of individual classes.

The number of classes or pupils involved in the various comparisons here reported is shown in the tables that follow.

Results

Table I gives comparisons between children in activity and control schools who were tested in the Spring of 1939. The table, it will be noted, is based upon the scores of children who were matched with respect to grade, sex, chronological age, and school (this last-named item means that schools were approximately matched with respect to general type of neighborhood and the socio-economic status of the school populations). The children represent seven activity and seven control schools. Table I is based upon a part of the population which is represented in Table XXVI in the report in this *Journal*, December, 1939. In that table, results were shown for the entire enrollment in 24 pairs of classes, as distinguished from the present somewhat more refined matching of from 197 to 216 pairs of children.

It will be noted, in Table I, that the activity children earned somewhat higher average scores on all of the tests, with the exception of one. The differences between the averages are small, however, and none of the differences is statistically reliable. In the table published in the earlier study, averages found for the activity children were higher than the control averages in four of the comparisons; there was a zero difference in the results of one test (Applying Generalizations) and a slight difference in favor of the control children in two of the comparisons (Working Skills and Explaining Facts). In other words, neither of the two series of computations shows any substantial or reliable differences between the two groups.

Tables II and III give results obtained in tests applied in the Spring of 1940. The tests include those represented in Table I as well as additional tests dealing with the natural sciences. Table II is based upon the scores obtained in 35 sixth grade activity classes and 34 sixth grade control classes in thirteen pairs of schools. The "averages" shown in this table represent, for each test, the average of the separate class averages: in other words, the *n*'s used in computing the reliabilities of the differences are based on respective populations of 35 and 34 rather than upon the total number of pupils included in the combined classes in each group.

Table III shows the results obtained from tests of 4th, 5th, and 6th grade pupils in 11 pairs of schools. Pupils of the activity and control groups were matched with respect to socio-economic status, school, grade, sex and chronological age. Table IV shows results obtained in January, 1941.

It can be noted that all comparisons shown in Table II favor the activity pupils. In the case of several tests, the differences approach statistical reliability, but in no instance is the critical ratio as high as three.

All but one of the comparisons in Table III likewise favor the activity pupils. In eight of the twelve comparisons the differences are statistically reliable. In no comparison, however, is there a very large difference between the averages. In the case of Working Skills in the social studies, for example, there is a statistically reliable difference, as represented by a critical ratio of 3.71; the respective averages, however, do not differ widely (29.69

Table I

Scores of Children in 13 Activity and 13 Matched Non-Activity Classes on the Wrightstone Tests as of June 1939. The Children Were Matched on the Basis of School, Grade, Sex and Chronological Age*

Test	No. of pairs	Average Scores: Activity	Average Scores: Non-Activity	Difference of Average Scores	Standard error of Difference	Critical ratio
Working Skills	203	28.4	27.9	.5	.61	.82
Explaining Facts	219	21.8	21.8	0		0
Applying Generalizations	197	13.66	13.54	.12	.41	.29
Current Events	205	33.2	31.9	1.3	.79	1.69
What Do You Believe	210	36.0	34.7	1.3	.56	2.32
Personality, Part I	216	59.5	58.4	1.1	.87	1.26
Personality, Part II	216	48.9	48.8	.1	.93	.11
Personality, Total	216	108.	106.9	1.1	1.44	.76

* The children represent seven activity and seven non-activity schools all of which were among the eight pairs of schools included in the study from its beginning.

TABLE II

COMPARISON BETWEEN THE AVERAGE SCORES OF ACTIVITY AND NON-ACTIVITY CLASSES ON THE WRIGHTSTONE TESTS, JUNE, 1940*

Test	No. of Classes		Mean Score				
	Activity	Non-Activity	Activity	Non-Activity	Difference	S. E. of diff.	Critical Ratio
Working Skills in the Social Studies	35	34	29.20	27.76	1.44	.87	1.66
Explaining Facts of the Social Studies	35	34	21.22	19.76	1.46	.68	2.15
Applying Generalizations in the Social Studies	34	32	14.44	13.16	1.28	.59	2.17
Current Events	35	34	32.12	29.95	2.17	1.30	1.67
What Do You Believe in the Social Studies	35	34	35.72	33.64	2.08	.87	2.39
Personality Trait Indicator—							
Part I	34	34	59.12	57.30	1.82	.84	2.17
Part II	34	34	48.48	46.94	1.54	.83	1.86
Total—Part I and II	34	34	107.36**	104.37**	2.99	1.41	2.12
Working Skills in the Natural Sciences	29	30	23.68	22.74	.94	.92	1.02
Explaining Facts of the Natural Sciences	29	29	15.95	15.84	.11	.68	.16
Applying Generalizations in the Natural Sciences	29	30	35.00	34.53	.47	.71	.66
What Do You Believe in the Natural Sciences	28	28	35.64	35.50	.14	.86	.16

* Representing thirteen activity and thirteen non-activity schools, including eight pairs that were studied from the inception of the investigation. The population includes 4 pairs of fourth grade classes, four pairs of fifth grade classes, and from 20 to 27 sixth grade classes.

The tests of the social studies, current events and personality were administered at the 6A grade level and the tests in the natural sciences at the 6B level.

** The Mean Personality Trait Indicator Score was computed independently; hence the mean of the total is slightly different from the sum of the means of the parts.

TABLE III

SCORES ON THE SOCIAL STUDIES (S) AND NATURAL SCIENCE (N) TESTS ADMINISTERED TO CHILDREN IN THE 4TH, 5TH, AND 6TH GRADES OF 11 ACTIVITY AND 11 NON-ACTIVITY SCHOOLS. THE CHILDREN WERE MATCHED ON THE BASIS OF SOCIO-ECONOMIC STATUS, SCHOOLS, GRADE, SEX AND CHRONOLOGICAL AGE, AS OF JUNE 1940

Test	No. of Cases	Average scores		Difference	S. E. of Difference	Critical ratios
		Activity	Non-Act.			
Working Skills (S)	585	29.69	28.65	1.04	.28	3.71
Explaining Facts (S)	583	21.78	19.92	1.86	.28	6.64
Applying Generalizations (S)	530	15.12	13.52	1.60	.24	6.67
Current Events (S)	591	32.92	30.85	2.07	.46	4.50
What Do You Believe (S)	559	36.08	34.12	1.96	.33	5.94
Personality, Part I	566	59.75	57.85	1.90	.54	3.52
Personality, Part II	576	48.80	47.85	.95	.59	1.61
Personality, Total	577	108.05	105.52	2.53	.84	3.01
Natural Science Tests						
Working Skills (N)	416	24.47	23.46	1.01	.39	2.59
Explaining Facts (N)	430	16.66	16.42	.24	.28	.86
Applying Generalizations (N)	445	36.34	34.71	1.63	.37	4.41
What Do You Believe (N)	411	36.44	36.54	—.10	.41	—.24

* The matched pairs of children were drawn from the large population represented in Table II.

TABLE IV

SCORES ON THE SOCIAL STUDIES (S) AND NATURAL SCIENCE (N) TESTS ADMINISTERED IN 13 ACTIVITY AND 13 NON-ACTIVITY SCHOOLS, JANUARY, 1941*

Test	No. of Classes Activity	No. of Classes Non-Act.	Class Average Activity	Class Average Non.-Act.	Difference	S. E. of Difference	Critical ratio
Working Skills (S)	31	28	28.02	27.25	.77	1.04	.74
Explaining Facts (S)	31	28	22.08	21.61	.47	.90	.52
Applying Generalizations (S)	31	28	15.11	14.57	.54	.68	.79
What Do You Believe (S)	31	28	32.60	32.00	.60	.79	.76
Current Events	31	28	30.02	29.89	.13	1.20	1.08
Personality Traits I	31	28	59.63	60.00	—.37	.96	—.39
Personality Traits II	31	28	49.21	48.61	.60	.85	.71
Personality Traits, Total	31	28	108.24	108.11	.13	1.63	.08
What Do You Believe (N)	38	36	30.82	29.72	1.10	.73	1.51
Working Skills (N)	38	36	21.32	21.36	—.04	.83	—.05
Applying Generalizations (N)	38	36	37.32	36.50	.82	.78	1.05
Explaining Facts (N)	38	36	22.84	22.94	—.10	.73	—.14

* Representing the thirteen pairs of schools shown in Table II, but results were obtained on different forms of the same series of tests. In this semester, the natural sciences tests were administered to the 6A groups, the others to the 6B groups.

and 28.63). In other comparisons likewise, in which critical ratios range from 3 upward to 6.67, the numerical differences between the averages are relatively small. In any event, it is noteworthy that the differences, although small in magnitude, preponderantly favor the activity groups.

In Table IV, based upon class averages rather than average scores of matched pupils, a majority of the comparisons likewise favor the activity groups, although the differences, in the main, are small and are not statistically reliable.

It may be noted, in passing, that in the earlier report, referred to above, comparisons between activity and control groups were shown for tests administered during three successive years. In each of these comparisons, the scores generally favored the activity groups. In the results shown for 1937, this group was ahead on all of the seven tests then used; in 1938, the activity group was ahead on six of the seven tests; and in 1939, as mentioned above, they were ahead on five of the seven tests. The new results here reported, accordingly, are substantially consistent with earlier findings, with the exception that the critical ratios based upon the scores of matched children, as shown in Table III, are higher, on the whole, than was the case in the earlier comparisons.

In the light of all the evidence that has accumulated through the use of the tests involved in the present study, it appears that the enterprises undertaken by the activity pupils enabled them to earn somewhat higher scores in dealing with problems such as those involved in the Wrightstone tests.

The results here reported may properly be considered in relationship to other findings that have accumulated in studies that already have been reported and in studies that now are under way. In the study already referred to (2) it was noted that the activity and control groups differed with respect to a number of factors that were studied by means of a method of direct observation. The control groups surpassed the activity groups with respect to frequency of recitational activities of a question-and-answer sort. The activity children showed higher frequencies than the controls with respect to the following categories: critical activities, experimental activities, leadership activities, and self-initiated activities.

In tests of achievement by means of the Modern School Achievement battery, the control children, in most of the comparisons that have been made, somewhat surpass the activity pupils although in the latest comparison, based upon scores of matched children,* the differences are relatively small and none of the differences is statistically reliable.

Data obtained by the method of direct observation in the classroom subsequent to the studies set forth in the 1939 report indicate that the activity children spend less time than do the controls on conventional subject-matter skills such as reading, spelling, and

* See an article entitled "Evaluative Studies of the Activity Program in the New York City Public Schools: A Preliminary Report" by Saul B. Sells, John J. Loftus and Louis Herbert in this number of the *Journal of Experimental Education*, pp. 310–322.

penmanship, and spend considerably more time than do the controls on certain other enterprises including arts, crafts, dramatics, and oral composition. The benefits accruing to the activity children by virtue of the time spent on these enterprises have not been measured systematically. Judged simply on the basis of what strikes the eye when an observer visits the classroom, it is apparent that the time devoted by the activity children to these last-named enterprises yield tangible results in the form of drawings, paintings, puppets, and finished products made of wood, metal, soap and clay, as well as numerous materials used in connection with the work of the class such as notebook folders, slides, and the like. Other evidences appear in the nature of dramatic performances, oral compositions, oral reports based on independent study, individual hobbies that have been coordinated with the work of the school, etc. Needless to say, classes vary with respect to evidences of this sort that meet the eye or the ear. Work of this kind is, of course, also seen in some classes in control schools, although generally it is not nearly so much in evidence. Pending more systematic appraisal of the benefit that children may obtain from work of this kind, it seems fair to state that the greater amount of time spent by the activity pupils on enterprises of this kind does entail the learning of certain skills that seem to be valuable as far as they go.

A brief comment might be made concerning the recurring tests of personality adjustments that are represented in each of the foregoing tables, even though these tests do not logically belong with the other tests dealing with intellectual functions. It can be noted that in all of the comparisons except one the activity children make a somewhat better showing than the controls, although the differences are not substantial and are statistically reliable in only a few of the comparisons. In any event, as far as these tests go, it would appear that activity children, if anything, are somewhat superior in their social and emotional adjustments. The personality tests represented in this report were supplemented in the winter semester of 1940–41 by a "What Do You Worry About?" inventory prepared by the senior author (6). A list of worries was presented and the children were asked to check whether they "often," "sometimes," or "never" worried about the situation in question. The results showed no significant differences between the two groups.

Accordingly, the picture as far as it emerges from the lines of investigation mentioned above shows that while the control children seem to have a slight but statistically unreliable advantage as far as achievement in academic subject-matter is concerned, the activity children surpass the controls in the frequency with which they exercise such presumably wholesome activities as leadership, experimentation, self-initiated enterprises, participation in oral discussion, and the like. The activity children have more experiences and show more tangible accomplishments in the fields of the arts and crafts. The activity children, as already noted, also tend to be superior in tests that call for intellectual operations such as those involved in the tests reported in the main body of the present study.

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EVALUATIVE STUDIES OF THE ACTIVITY PROGRAM* IN THE NEW YORK CITY PUBLIC SCHOOLS: A PRELIMINARY REPORT

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This report presents the statistical techniques and the results of studies comparing test performances of pupils in nine elementary schools in New York City in which the official Activity Program Experiment has been conducted with the performances of pupils in nine regular elementary schools selected as "controls" on the basis of similarity of neighborhood and pupil population to each Activity Program school. These schools have been described in detail by Jersild, Thorndike, Goldman and Loftus (2).

These studies are based upon data obtained with three tests which were administered to all pupils in grades 4A to 6B, inclusive, in the respective schools, at intervals from the Spring, 1937 to the Spring, 1940. The tests are the following:

1) the School Practices Questionnaire (4), by McCall, Herring and Loftus, which was designed to furnish a measure of the amount of "activity" in a class by asking pupils to indicate the frequency with which they performed specific functions "during the past four weeks" in connection with class discussions and activities;

2) the Modern School Achievement Test (1), by Gates, Mort, Symonds, et al., a "traditional" academic achievement test, which gives measures of Reading Comprehension, Reading Speed, Arithmetic Computation, Arithmetic Reasoning, Spelling, and Language Usage;

3) the Comprehensive Achievement Test (3), by McCall and Herring, which was designed to measure "functional" outcomes expected of a well rounded program of elementary education.

These tests are discussed in detail elsewhere (2).

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STUDY I. COMPARISON OF MEDIAN SCORES OF PUPILS IN ACTIVITY AND CONTROL SCHOOLS

DESIGN

In the following comparisons the data of the semi-annual testing programs were used, including all data available for each test at each date. No attempt was made to equate groups on the basis of intelligence, age or other factors affecting test scores. The groups compared differ in terms of the schools from which they were selected. The following comparisons were made using the method of Analysis of Variance, with two criteria of classification:

1) Comparisons between individual pairs of schools for each test and date of administration separately. Nine such sets of comparison tables have been computed, Tables I to IX.

The design of each table is illustrated by Tables IA and IB, at the end of this report.

2) Comparisons between the groups of activity and control schools in terms of median grade scores for each test at each date of administration. Six such sets of comparison tables have been computed, Tables X to XV.

The design of each table is illustrated by Tables XA and XB, following this report.

RESULTS

The complete results of this study will be published in a forthcoming article. A summary of the findings is presented herewith in Tables 1 and 2.

Table 1 presents the results of Tables I to IX. This table analyzes data for the School Practices Questionnaire at annual intervals,

TABLE I

SUMMARY OF TABLES I TO IX

PRESENTING RESULTS OF COMPARISON OF MEDIAN SCORES OF PUPILS IN NINE MATCHED PAIRS OF ACTIVITY AND CONTROL SCHOOLS, INDIVIDUALLY, ON 1) SCHOOL PRACTICES QUESTIONNAIRE, 2) MODERN SCHOOL ACHIEVEMENT TEST, AND 3) COMPREHENSIVE ACHIEVEMENT TEST—AT SPECIFIED DATES

School Pair No. (Corresponding to Table No.)

Date	I Diff.	P	II Diff.	P	III Diff.	P	IV Diff.	P	V Diff.	P	VI Diff.	P	VII Diff.	P	VIII Diff.	P	IX Diff.	P
1) School Practices Questionnaire (Score)																		
Spring 1937	A 13.13	.05	A 9.00	X	0	X	A 8.91	X	A4.50	X	A16.25	.05	A10.24	X	A 7.02	X	------	
Spring 1938	A13.91	.05	A10.36	.01	A10.59	.01	A 5.40	X	A2 32	X	A13.01	.01	A 9.29	X	A11.51	.01	A6.71	X
Spring 1939	A17.26	.01	C 3.18	X	A43.36	.01	A 9.23	X	C [illegible]	X	A21.22	.01	A10.08	X	A 6.85	X	A .75	X
Spring 1940	A16.12	.01	A 6.46	X	A39.96	.01	A11.20	.05	A [illegible]	X	A29.21	.05	A13.40	.01	A 7.09	X	C .60	X
2) Modern School Achievement Test (Grade Score)																		
Spring 1937	A	.41	X	0		.05	A	.38	X	C	.90	.01	A	.15	X	A	.73	X	A	.03	X	C	.63	.05	------	
Fall 1939	C	.31	.05	C	.17	X	A	.51	X	C	.79	.01	C	.07	X	C	.34	X	C	.21	.05	C	.21	X	A .28	X
3) Comprehensive Achievement Test (Grade Score)																		
Spring 1937	A	.17	X	A	.02	X	A	.18	X	C	.81	.05	A	.78	.01	A	.25	X	A	.20	.05	C	1.13	.01	------	
Spring 1940	A	1.04	.05	C	.01	X	A	.95	.05	C	.39	X	C	.23	X	A	.95	X	A	.28	X	C	.10	X	A .10	X

from Spring, 1937 to Spring, 1940 and the results of initial and final achievement test administrations. Each of the original tables comprises the analysis for an individual pair of schools.

The significant statistics reported in Table 1 are a) the difference between the school medians (Diff.) and b) the probability value of the ratio F, comparing the mean square of the variance between median scores of the two schools with the mean square of the variance attributable to residual experimental error (P). The entries in the column headed Diff. indicate the higher median score by the letter A or C (Activity or Control) beside the Median Difference. The entries in the P columns indicate whether the differences between school medians are significant with a probability of 99 chances in 100 (.01), 95 chances in 100 (.05) or are not significant (x).

Table 1 indicates that the median scores of Activity schools on the School Practices Questionnaire exceed those of the respective Control schools in all but 4 of 35 comparisons. Although there are variations among the Activity schools and a tendency for the Control schools to adopt many of the progressive practices during the course of the experiment, the results show a greater increase in "activity" practices among the experimental schools. Significant differences occur between only 2 pairs of schools in the Spring, 1937, while there are 5 significant differences in the Spring, 1940. The magnitude of the differences increases, too, from 1937 to 1940.

Comparison of the achievement test results in pairs of individual schools confirms the pattern observed in previous studies (2). The differences are slight, only occasionally significant, and oriented in respect to the bias of the test content. The Activity groups are given a slight advantage on the Comprehensive Achievement Test and the Control groups a similar advantage on the Modern School Achievement Test. These differences may be seen in Table 1, despite the fact that some of the results appear to be accounted for by population differences rather than differential school practices. Evidences of population differences may be seen in columns III, IV and VIII of Table 1.

Table 2 summarizes the results of Tables X to XV. This table analyzes the data of Tables I to IX, summarized in Table 1, arranged in a different way. Tables X to XV combine all nine Activity schools and Control schools into groups, by grade. The comparisons are made by grade at each date of testing. While in the preceding table the data for the School Practices Questionnaire were analyzed only at annual intervals, Table 2 includes the results of the Fall of 1938 and the Fall of 1939 in addition to the annual Spring results.

The statistics reported in Table 2 are the same as those of Table 1. Each entry is either a median difference between groups (Diff.) or a probability value of an F ratio (P).

The data presented in Table 2 confirm the outcome indicated by Table 1. In all 34 comparisons on the School Practices Questionnaire, the Activity groups obtained higher median scores. In 22 of the 34 comparisons, the differences between means of group medians are significant. The magnitude of the differences increased from the Spring, 1937 to the Spring, 1940. The general improvement among Control schools, in many cases, suggests that "activity" practices were being adopted gradually by Control schools. This tendency resulted in smaller median differences and overlapping of distributions of scores on the School Practices Questionnaire.

The achievement results presented in Table 2 indicate almost complete overlapping between Activity and Control groups on both tests. On the Modern School Achievement Test, the Control group median grade score is higher in 4 of 5 grades in Spring, 1937 and in 3 of 6 grades in Fall, 1939. None of the 1937 differences is significant, while only 2 of the 1939 differences are. The differences range from .03 grade to .12 in 1937 and from .07 to .39 in 1939.

The results on the Comprehensive Achievement Test indicate consistent differences in favor of the Activity group. However, only 2 of 9 comparisons, one in 1937 and the other in 1940, is significant.

Discussion

To the extent that the School Practices Questionnaire is a valid indicator of the degree to which activity practices are actually in operation within a given classroom, the results of this study show a genuine difference between the Activity schools and the paired Control schools.

TABLE II

SUMMARY OF TABLES X TO XV

PRESENTING RESULTS OF COMPARISON OF MEDIAN SCORES OF PUPILS IN MATCHED ACTIVITY AND CONTROL GROUPS OF SCHOOLS, BY GRADE, ON 1) SCHOOL PRACTICES QUESTIONNAIRE, 2) MODERN SCHOOL ACHIEVEMENT TEST, AND 3) COMPREHENSIVE ACHIEVEMENT TEST—AT SPECIFIED DATES

Date (and Original Table No.)

Grade	X Spring 1937		XI Spring 1938		XII Fall 1938		XIII Spring 1939		XIV Fall 1939		XV Spring 1940	
	Diff.	P	Diff.	P	Diff.	P	Diff.	P	Diff.	P	Diff.	P
1) School Practices Questionnaire (Score)												
4A	A 3.11	.05	A 5.55	.01	A 14.86	X	A 10.94	X	A 11.63	.01	A 11.25	.05
4B	A 6.67	X	A 3.25	X	A 8.33	X	A 11.33	X	A 13.33	X	A 10.77	X
5A	A 8.90	X	A 7.30	.01	A 6.56	.05	A 9.72	X	A 11.36	.05	A 11.67	X
5B	A 8.87	.05	A 11.37	.05	A 15.87	.01			A 9.67	.05	A 12.00	X
6A	A 10.68	.05	A 11.50	.01	A 16.81	.01	A 11.31	.05	A 8.05	.05	A 11.54	.05
6B			A 10.37	.01	A 18.53	.05	A 16.36	.01	A 12.35	.05	A 15.60	.05
2) Modern School Achievement Test (Grade Score)												
4A	C .03	X							C .18	.05		
4B	C .11	X							A .12	X		
5A	A .12	X							C .18	.05		
5B	C .12	X							A .39	X		
6A	C .05	X							A .07	X		
6B									C .26	X		
3) Comprehensive Achievement Test (Grade Score)												
4A	A .20	X										
4B	A .26	X									A .06	X
5A	A .09	X									A .43	X
5B	A .19	.05									A .66	.05
6A	A .41	X									A .85	X
6B												

An understanding of the chief respects of practice in which the experimental and control schools differ and of the uncontrolled factors operative to affect test performances is essential for an adequate appraisal of the achievement test results.

One important respect of practice in which the Activity and Control schools differ is in the amount of classroom time devoted to the study of formal subjects. Tables 3 and 4, prepared from data submitted by Principals of elementary schools at the request of the Division of Elementary Schools are samples of observations made on two separate days in two different sets of schools. Table 3 reports the time schedules of classes, in the nine pairs of schools studied above, on June 13, 1941. Table 4 presents similar data from ten other pairs of Activity and comparable Regular schools, on June 24, 1941. The design of Tables 3 and 4 is identical. Each table presents time schedules for fourth, fifth and sixth year classes, separately. The schedules are given for Arithmetic, Reading, Spelling, Language Study and Penmanship, in three categories: a) the Official Schedule, recommended by the Elementary School Division, b) the reports for Activity schools, and c) the reports for Control schools.

It will be noted that the median time schedule of Activity classes for the activities listed in Table 3 is about 80 per cent that of the Control classes, while in Table 4 the ratio is about 70 per cent. Tables 3 and 4 are typical of the findings with respect to time schedule.

The time thus diverted from study of formal subjects in the Activity schools is occupied with other practices considered essential to the program. These include cooperative group activities in the development of units of work, the development and expression of basic understandings, skills, critical activities, experimental activities, leadership activities, attitudes, interests and appreciations. While the Activity Program schools thus include many "newer practices" in the curriculum, a major portion of the activity of the pupils is devoted to the study of formal required subjects.

The effectiveness of this instruction is supported by the results of the Modern School Achievement Test, which measures outcomes of instruction of the formal type. On this test the Control groups were found to be neither consistently nor significantly ahead of the Activity groups. It is suggested, then, that the results of this study indicate that the

TABLE III

TIME SCHEDULES FOR FORMAL SUBJECTS* FOR 9 ACTIVITY AND 9 CONTROL SCHOOLS—JUNE 13, 1941

	Arithmetic	Reading	Spelling	Language	Penmanship
SIXTH YEAR					
Official	180	120	100	------	75
9 Activity					
Range	118–212	0–220	40–150	26–115	0–75
Average	164	94	87	50	35
9 Control					
Range	180–240	120–253	80–125	30–90	60–80
Average	198	196	106	59	75
FIFTH YEAR					
Official	180	120	100	------	75
9 Activity					
Range	144–200	40–220	75–125	30–115	0–75
Average	164	113	89	58	40
9 Control					
Range	180–250	120–292	80–125	30–90	60–90
Average	206	73	106	57	75
FOURTH YEAR					
Official	180	160	100	------	75
9 Activity					
Range	112–206	40–220	75–150	30–115	0–75
Average	164	134	95	59	46
9 Control					
Range	150–225	140–240	90–160	30–85	65–80
Average	193	184	120	51	75

* in minutes

TABLE IV

TIME SCHEDULES FOR FORMAL SUBJECTS* FOR 10 ACTIVITY AND 10 REGULAR SCHOOLS—JUNE 24, 1941

	Arithmetic	Reading	Spelling	Language	Penmanship
SIXTH YEAR					
Official	180	120	100	------	75
10 Activity					
Range	40–200	40–225	30–102	30–132	30–75
Average	159	100	69	64	44
10 Control					
Range	150–210	120–250	75–105	30–215	30–100
Average	192	177	91	122	67
FIFTH YEAR					
Official	180	120	100	------	75
10 Activity					
Range	40–200	40–225	30–126	30–126	30–75
Average	165	107	73	66	45
10 Control					
Range	150–225	120–250	75–100	60–170	75
Average	193	188	91	119	75
FOURTH YEAR					
Official	180	160	100	------	75
10 Activity					
Range	40–210	40–225	30–118	30–162	20–75
Average	173	123	75	74	46
10 Control					
Range	150–240	60–330	75–100	30–180	70–75
Average	189	200	95	120	74

* in minutes

TABLE IA

ANALYSIS OF VARIANCE OF GRADE MEDIANS OF MATCHED PAIR (I) OF MANHATTAN SCHOOLS, ON (1) SCHOOL PRACTICES QUESTIONNAIRE, (2) MODERN SCHOOL ACHIEVEMENT TEST AND (3) COMPREHENSIVE ACHIEVEMENT TEST AT SPECIFIED DATES

(1) School Practices Questionnaire

	Sum of Squares	Degrees of Freedom	Mean Square
Spring 1937			
Total Variance	693.12	9	77.01
Bet. M's of Grades	125.83	4	31.46
Bet. M's of Schools	460.68	1	460.68
Remainder	106.61	4	26.65
Spring 1938			
Total Variance	543.28	11	49.39
Bet. M's of Grades	130.72	5	26.14
Bet. M's of Schools	299.12	1	299.12
Remainder	113.44	5	22.69
Spring 1939			
Total Variance	766.89	9	85.21
Bet. M's of Grades	43.98	4	11.00
Bet. M's of Schools	680.93	1	680.93
Remainder	41.98	4	10.50
Spring 1940			
Total Variance	849.95	11	77.27
Bet. M's of Grades	146.99	5	29.40
Bet. M's of Schools	663.84	1	666.84
Remainder	36.12	5	7.22

(2) Modern School Achievement Test

	Sum of Squares	Degrees of Freedom	Mean Square
Spring 1937			
Total Variance	3.01	9	.33
Bet. M's of Grades	2.78	4	.70
Bet. M's of Schools	.09	1	.09
Remainder	.14	4	.04
Fall 1939			
Total Variance	8.15	11	.74
Bet. M's of Grades	7.91	5	1.58
Bet. M's of Schools	.14	1	.14
Remainder	.10	5	.02

(3) Comprehensive Achievement Test

Spring 1937			
Total Variance	4.15	9	.46
Bet. M's of Grades	3.98	4	1.00
Bet. M's of Schools	.00	1	.00
Remainder	.17	4	.04
Spring 1940			
Total Variance	8.23	7	1.18
Bet. M's of Grades	5.40	3	1.80
Bet. M's of Schools	2.49	1	2.49
Remainder	.34	3	.11

TABLE IB

MATCHED PAIR (I) OF MANHATTAN SCHOOLS, MEDIAN SCORES ON (1) SCHOOL PRACTICES QUESTIONNAIRE, (2) MODERN SCHOOL ACHIEVEMENT TEST AND (3) COMPREHENSIVE ACHIEVEMENT TEST AT SPECIFIED DATES

(1) School Practices Questionnaire (Score)

		Medians							No. Cases					
		4A	4B	5A	5B	6A	6B	Total	4A	4B	5A	5B	6A	6B
Spring 1937	A	57.78	57.68	64.50	55.56	48.06	----	57.68	73	75	35	60	72	----
	C	46.86	48.33	37.86	44.55	38.21	----	44.55	55	106	62	69	59	----
Spring 1938	A	49.53	51.50	51.32	50.45	52.19	40.79	50.89	95	72	93	76	41	107
	C	43.83	48.25	36.25	35.75	34.04	37.71	36.98	73	103	86	104	73	67
Spring 1939	A	55.83	55.18	52.22	----	56.94	53.75	55.18	64	63	107	----	65	86
	C	40.00	44.21	37.92	----	35.25	33.75	37.92	92	60	124	----	102	65
Spring 1940	A	57.50	57.78	50.00	62.78	47.78	52.81	55.16	52	55	66	98	60	58
	C	44.06	39.58	38.13	41.74	37.50	38.50	39.04	70	91	47	96	34	66
		Differences												
Spring 1937		10.92	9.35	26.64	11.01	9.85	----	13.13						
Spring 1938		5.70	3.25	15.07	14.70	18.15	3.08	13.91						
Spring 1939		15.83	10.97	14.30	----	21.69	20.00	17.26						
Spring 1940		13.44	18.20	11.87	21.04	10.28	14.31	16.12						

(2) Modern School Achievement Test (Grade)

Spring 1937	A	3.26	3.80	4.21	4.25	4.52	----	4.21	73	75	35	60	72	----
	C	2.91	3.47	3.80	4.17	4.76	----	3.80	55	106	62	69	59	----
Fall 1939	A	3.33	3.38	3.96	4.31	5.05	5.18	4.14	64	63	107	61	65	86
	C	3.25	3.43	4.11	4.79	5.33	5.62	4.45	92	60	124	70	102	65
		Differences												
Spring 1937		.35	.33	.41	.08	—.24	----	.41						
Fall 1939		.08	—.05	—.15	—.48	—.28	—.44	—.31						

(3) Comprehensive Achievement Test (Grade)

		Medians												
Spring 1937	A	3.31	3.66	4.07	4.60	4.61	----	4.07	73	75	35	60	72	----
	C	2.98	3.70	3.90	4.98	4.88	----	3.90	55	106	62	69	59	----
Spring 1940	A	----	----	5.13	5.98	6.60	7.93	6.29	----	----	66	98	60	58
	C	----	----	4.46	5.19	5.31	6.22	5.25	----	----	47	96	34	66
		Differences												
Spring 1937		.33	—.04	.17	—.38	—.27	----	.17						
Spring 1940		----	----	.67	.79	1.29	1.71	1.04						

TABLE XA

ANALYSIS OF VARIANCE OF GRADE MEDIANS OF NINE PAIRS OF MATCHED ACTIVITY AND CONTROL SCHOOLS ON (1) SCHOOL PRACTICES QUESTIONNAIRE, (2) MODERN SCHOOL ACHIEVEMENT TEST AND (3) COMPREHENSIVE ACHIEVEMENT TEST—SPRING 1937

(1) **School Practices Questionnaire**

	Sum of Squares	Degrees of Freedom	Mean Square
4A			
Total Variance	1020.17	15	68.01
Bet. M's of Schools	686.52	7	98.07
Bet. M's of Groups	150.44	1	150.44
Remainder	183.21	7	26.17
4B			
Total Variance	980.87	15	65.39
Bet. M's of Schools	440.57	7	62.94
Bet. M's of Groups	118.19	1	118.19
Remainder	422.11	7	60.30
5A			
Total Variance	2200.99	15	146.73
Bet. M's of Schools	1094.41	7	156.34
Bet. M's of Groups	251.22	1	251.22
Remainder	855.36	7	122.19
5B			
Total Variance	878.99	15	58.60
Bet. M's of Schools	329.14	7	47.02
Bet. M's of Groups	323.37	1	323.37
Remainder	226.48	7	32.35
6A			
Total Variance	1264.72	15	84.32
Bet. M's of Schools	489.38	7	69.91
Bet. M's of Groups	486.05	1	486.05
Remainder	289.29	7	41.33

(2) **Modern School Achievement Test**

	Sum of Squares	Degrees of Freedom	Mean Square
4A			
Total Variance	6.34	15	.42
Bet. M's of Schools	6.02	7	.86
Bet. M's of Groups	.08	1	.08
Remainder	.24	7	.03
4B			
Total Variance	5.71	15	.38
Bet. M's of Schools	5.01	7	.72
Bet. M's of Groups	.14	1	.14
Remainder	.56	7	.08
5A			
Total Variance	7.81	15	.52
Bet. M's of Schools	6.79	7	.97
Bet. M's of Groups	.00	1	.00
Remainder	1.02	7	.15
5B			
Total Variance	10.40	15	.69
Bet. M's of Schools	9.63	7	1.38
Bet. M's of Groups	.28	1	.28
Remainder	.49	7	.07
6A			
Total Variance	11.15	15	.74
Bet. M's of Schools	10.65	7	1.52
Bet. M's of Groups	.11	1	.11
Remainder	.39	7	.06

(3) **Comprehensive Achievement Test**

4A			
Total Variance	8.22	15	.55
Bet. M's of Schools	7.68	7	1.10
Bet. M's of Groups	.02	1	.02
Remainder	.52	7	.07
4B			
Total Variance	14.78	15	.99
Bet. M's of Schools	13.51	7	1.93
Bet. M's of Groups	.001	1	.001
Remainder	1.27	7	.18
5A			
Total Variance	15.14	15	1.01
Bet. M's of Schools	13.80	7	1.97
Bet. M's of Groups	.02	1	.02
Remainder	1.32	7	.19
5B			
Total Variance	18.49	15	1.23
Bet. M's of Schools	16.38	7	2.34
Bet. M's of Groups	1.24	1	1.24
Remainder	.87	7	.12
6A			
Total Variance	24.21	15	1.61
Bet. M's of Schools	23.18	7	3.31
Bet. M's of Groups	.01	1	.01
Remainder	1.02	7	.15

TABLE XB

NINE MATCHED PAIRS OF ACTIVITY AND CONTROL SCHOOLS MEDIAN SCORE FOR EACH GRADE ON (1) SCHOOL PRACTICES QUESTIONNAIRE, (2) MODERN SCHOOL ACHIEVEMENT TEST AND (3) COMPREHENSIVE ACHIEVEMENT TEST—SPRING 1937

(1) School Practices Questionnaire

School Pairs

		1	2	3	4	5	6	7	8	Total
4A	A	57.78	52.14	44.58	48.75	48.33	36.39	55.94	41.11	48.54
	C	48.86	44.00	47.27	30.50	49.17	36.25	51.25	30.21	45.43
4B	A	57.68	53.00	51.18	51.33	46.25	52.50	57.02	44.74	51.92
	C	48.33	48.33	48.93	45.83	43.00	29.63	44.67	28.93	45.25
5A	A	64.50	32.50	43.75	39.41	47.50	50.29	75.75	55.63	48.90
	C	37.86	40.00	37.28	40.00	45.00	39.17	41.35	65.21	40.00
5B	A	55.56	59.38	45.28	45.50	44.72	53.13	58.53	53.75	53.44
	C	44.55	32.50	44.58	37.50	37.50	47.50	48.29	52.08	44.57
6A	A	48.06	60.63	42.19	46.41	49.17	62.08	60.18	55.00	52.09
	C	38.21	44.23	42.50	35.48	40.31	32.06	56.05	46.73	41.41

Differences

4A	10.92	8.14	—2.69	18.25	—.84	.14	4.69	10.90	3.11
4B	9.35	4.67	2.25	5.50	3.75	22.87	12.35	15.81	6.67
5A	26.64	—7.50	6.47	—.59	2.50	11.12	34.40	—9.58	8.90
5B	11.01	26.88	.70	8.00	7.22	5.63	10.24	1.67	8.87
6A	9.85	16.40	—.31	10.93	8.86	30.02	4.13	8.27	10.68

Number of Cases

4A	A	73	53	65	82	41	68	106	63
	C	55	50	87	130	56	106	79	65
4B	A	75	39	100	107	73	29	104	71
	C	106	65	104	143	40	117	103	67
5A	A	35	35	64	76	57	64	69	64
	C	62	74	96	132	61	119	89	75
5B	A	60	62	60	83	54	69	109	78
	C	69	62	102	166	40	111	132	77
6A	A	72	35	76	100	55	38	83	80
	C	59	98	100	140	59	95	99	73

(2) Modern School Achievement Test

School Pairs

		1	2	3	4	5	6	7	8	Total
4A	A	3.26	4.52	4.21	4.65	3.40	4.30	3.20	4.23	4.22
	C	2.91	4.76	4.17	5.12	3.43	4.33	3.58	4.58	4.25
4B	A	3.80	4.56	4.51	4.83	3.97	4.71	3.70	5.00	4.54
	C	3.47	4.63	4.67	5.90	4.13	4.95	3.93	4.93	4.65
5A	A	4.21	5.07	5.35	5.58	4.40	5.89	4.46	5.21	5.14
	C	3.80	5.07	4.97	6.48	4.25	5.16	4.43	5.84	5.02
5B	A	4.25	5.33	5.64	6.15	4.96	6.09	4.58	5.75	5.49
	C	4.17	5.80	5.41	7.10	5.06	6.61	4.67	6.04	5.61
6A	A	4.52	6.38	6.38	6.80	5.67	6.65	5.20	6.27	6.33
	C	4.76	6.61	6.15	7.55	5.53	6.92	4.99	6.67	6.38

Differences

4A	.35	—.20	.04	—.47	—.03	—.03	—.38	—.35	—.03
4B	.33	—.07	—.16	—1.07	—.16	—.24	—.23	—.07	—.11
5A	.41	0	.38	—.90	.15	.73	.03	—.63	.12
5B	.08	—.47	.23	—.95	—.10	—.52	—.09	—.29	—.12
6A	—.24	—.23	.23	—.75	.14	—.27	.21	—.40	—.05

Number of Cases

4A	A	73	53	65	82	41	68	106	63
	C	55	50	87	130	56	106	79	65
4B	A	75	39	100	107	73	29	104	71
	C	106	65	104	143	40	117	103	67
5A	A	35	35	64	76	57	64	69	64
	C	62	74	96	132	61	119	89	75
5B	A	60	62	60	83	54	69	109	78
	C	69	62	102	166	40	111	132	77
6A	A	72	35	76	100	55	38	83	80
	C	59	98	100	140	59	95	99	73

(3) Comprehensive Achievement Test

School Pairs

		1	2	3	4	5	6	7	8	Total
4A	A	3.31	4.54	4.74	5.32	3.64	4.63	3.85	4.50	4.52
	C	2.98	4.30	4.70	5.24	3.32	4.34	3.68	5.32	4.32
4B	A	3.66	5.40	4.60	5.86	4.47	5.28	3.74	5.80	4.94
	C	3.70	4.34	5.02	6.56	3.93	5.18	3.68	6.48	4.68
5A	A	4.07	5.18	5.70	6.21	5.38	5.93	4.48	----	5.54
	C	3.90	5.38	5.52	7.02	4.60	5.68	4.28	7.38	5.45
5B	A	4.60	6.41	6.16	6.90	6.07	6.65	4.92	6.93	6.29
	C	4.98	6.08	6.12	7.86	5.00	7.76	4.54	7.66	6.10
6A	A	4.61	7.22	7.26	7.73	6.56	7.38	5.50	8.12	7.24
	C	4.88	6.66	7.00	8.40	5.77	7.86	4.98	8.40	6.83

Differences

4A	.33	.24	.04	.08	.32	.29	.17	—.82	.20
4B	—.04	1.06	—.42	—.70	.54	.10	.06	—.68	.26
5A	.17	—.20	.18	—.81	.78	.25	.20	—1.13	.09
5B	—.38	.33	.04	—.96	1.07	—1.11	.38	—.73	.91
6A	—.27	.56	.26	—.67	.79	—.48	.52	—.28	.41

Number of Cases

4A	A	73	53	65	82	41	68	106	63
	C	55	50	87	130	56	106	79	65
4B	A	75	39	100	107	73	29	104	71
	C	106	65	104	143	40	117	103	67
5A	A	35	35	64	76	57	64	69	64
	C	62	74	96	132	61	119	89	75
5B	A	60	62	60	83	54	69	109	78
	C	69	62	102	166	40	111	132	77
6A	A	72	35	76	100	55	38	83	80
	C	59	98	100	140	59	95	99	73

diversion of part of the classroom time of the Activity Program classes to the "newer practices" was accomplished without significant prejudice to the satisfactory attainment of "desired" outcomes in the formal subjects.

The studies of Dr. Jersild, Dr. Wrightstone and others are concerned with the appraisal of certain of the "newer practices" of the Activity Program conducted in the same schools and with other phases of the experiment. The complete evaluation must consider all aspects of the program. The findings of the present study, while limited to a narrow area, achievement in formal subjects in relation to variations in practice, contain evidence of a much richer and more functional program in the Activity schools.

Summary

1) Analysis of Variance of the results with the School Practices Questionnaire indicates consistent differences between Activity and Control schools which increase from 1937 to 1940. Differences between individual Activity and Control schools, favoring the Activity schools, are found in all comparisons.

2) Variations in achievement test performances observed between individual pairs of schools (Table 1) seem to be due to differences in pupil populations as well as to differences in practice. Comparisons of achievement test results generally indicate a slight difference in favor of the Activity groups on the Comprehensive Achievement Test and a similar slight difference in favor of the Control groups on the Modern School Achievement Test. These differences are in accordance with the respective biases of the test contents. The differences are generally not statistically significant when tested by Analysis of Variance.

3) Reversals of trend in median differences of achievement grades of Activity and Control pupils indicate that despite variation in practice, the tasks used to measure achievement on these tests do not discriminate between the groups either significantly or consistently.

4) Comparison of time schedules for study of formal subjects of the group of nine Activity and nine Control schools included in the testing program (Table 3, June 13, 1941) and of another group of ten Activity and ten Control schools (Table 4, June 24, 1941) indicates that the Activity Program classes spend from 70 to 80 per cent as much time

as the Control school classes in the study of formal subjects.

5) Analysis of results on the Modern School Achievement Test in relation to the amount of classroom time spent on the study of formal subjects by the Activity and Control groups respectively, suggests that the diversion of part of the classroom time of the Activity Program classes to "newer practices" was accomplished without significant prejudice to the satisfactory attainment of "desired" outcomes in the formal subjects.

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STUDY II. COMPARISON OF MEAN AND MEDIAN SCORES OF EQUATED GROUPS OF ACTIVITY AND CONTROL PUPILS*

Problem

None of the previously published reports of test results concerning the New York City official Activity Program experiment has been based upon data in which the populations compared were controlled on the basis of equal initial mastery of the tasks measured by the tests or equal intellectual ability.

This study was designed to achieve some control of the initial status of the groups to be compared. From the records of the pupils in the nine Activity and nine Control schools in which the regular testing program was conducted, eighty-eight pairs of pupils were selected who were matched individually on the following criteria: a) chronological age, b) sex, c) McCall Intelligence Test grade score in grade 4A, Spring, 1937, d) each was enrolled in grade 4A in the Spring, 1937 and remained in the same school, making regular progress for two and one half years, to grade 6B, in the Fall, 1939. This sample of eighty-eight pairs of cases, while limited in size, is valuable for the purpose of the special analysis for which the present study is designed. Considerations of the testing schedule and of the administration of the program led to the selection of the groups starting in grade 4A in the Spring, 1937 for this study. These groups may be expected to have had more uniform past experience at the outset of the experiment.

* A complete report of this study will be published in a forthcoming article by the present authors in collaboration with Dr. Irving Lorge.

Design

The scores of the two groups of pupils on 1) the School Practices Questionnaire, 2) the Modern School Achievement Test, and 3) the Comprehensive Achievement Test at initial and final dates of testing, were analyzed by correlation methods, including the method of discriminant function of R. A. Fisher (1), and by comparison of mean and median group differences.

Results

Only the inter-group comparisons of means and median scores are summarized in this report. The results are shown in Tables 5 and 6.

Table 5 presents the Mean scores, Mean Differences, and critical ratios of the differences to their respective standard errors.

The initial test was given in April, 1937. A significant difference is found between the two groups on the School Practices Questionnaire at this point. The critical ratio of 2.01 is within the .05 criterion. The final comparison on this test reveals a considerable separation of the groups, the Activity group gaining a mean increment of 11.42, while the Control group gained a mean increment of only 4.83.

The Control group obtained a higher initial mean score on the Modern School Achievement Test and gained a significantly higher final mean score. The initial difference of .18 grade, roughly equivalent to a higher grade status of 2 months, is not statistically significant. The final difference of .53 grade, roughly equivalent to five months is within the criterion of .01 on the basis of the critical ratio of 2.3.

TABLE V

COMPARISON OF MEAN SCORES OF MATCHED GROUPS OF ACTIVITY AND CONTROL PUPILS, EQUATED ON BASIS OF AGE, SEX, AND MCCALL INTELLIGENCE SCORES—ON 1) SCHOOL PRACTICES QUESTIONNAIRE, 2) MODERN SCHOOL ACHIEVEMENT TEST, AND COMPREHENSIVE ACHIEVEMENT TEST (N=88 IN EACH GROUP)

	Mean Scores			
	Activity Group	Control Group	Diff. A-C	Critical Ratio
1) **School Practices Questionnaire** (Score)				
4A—Spring 1937	45.00	40.45	4.55	2.01
6B—Fall 1939	55.91	45.34	10.57	4.21
Increment	11.42	4.83	6.59	2.18
2) **Modern School Achievement Test** (Grade Score)				
4A—Spring 1937	4.31	4.49	—.18	—1.29
6B—Fall 1939	7.44	7.97	—.53	—2.30
Increment	3.15	3.48	—.33	—2.20
3) **Comprehensive Achievement Test** (Grade Score)				
4A—Spring 1937	4.74	4.70	.04	.20
6B—Fall 1939	8.74	8.55	.19	.56
Increment	4.02	3.84	.18	.62

TABLE VI

COMPARISON OF MEAN AND MEDIAN SCORES OF MATCHED GROUPS OF ACTIVITY AND CONTROL PUPILS, EQUATED ON BASIS OF AGE, SEX, AND MCCALL INTELLIGENCE SCORES — ON MODERN SCHOOL ACHIEVEMENT TEST (N=88 IN EACH GROUP)

	4A—SPRING, 1937				6B—FALL, 1939			
	Mean A	Mean C	Diff. A-C	Crit. Ratio	Mean A	Mean C	Diff. A-C	Crit. Ratio
Total Score	4.31	4.49	—.18	—1.29	7.44	7.97	—.53	—2.30
Read. Compre.	4.19	4.30	—.11	— .50	7.48	7.77	—.29	—1.21
Read. Speed	4.42	4.79	—.37	—1.76	7.47	7.75	—.28	—1.04
Arith. Comp.	3.85	4.27	—.42	—4.20	7.03	7.81	—.78	—3.25
Arith. Reas.	3.62	3.95	—.33	—3.00	6.43	7.06	—.63	—2.42
Spelling	4.34	4.26	.08	.57	6.89	7.10	—.21	—1.40
Lang. Usage	4.24	4.39	—.15	— .60	7.11	7.57	—.46	—1.64
	Median A	Median C	Diff. A-C	Crit. Ratio	Median A	Median C	Diff. A-C	Crit. Ratio
Total Score	4.26	4.57	—.31	....	7.50	7.90	—.40	....
Read. Compre.	4.50	4.54	—.04	— .21	8.00	8.42	—.42	—1.75
Read. Speed	4.60	5.05	—.45	—2.65	7.80	8.83	—1.03	—3.81
Arith. Comp.	4.15	4.58	—.43	—4.78	7.20	8.46	—1.26	—4.85
Arith. Reas.	3.80	4.26	—.46	—4.60	6.50	7.33	—.83	—3.07
Spelling	4.66	4.48	.18	1.38	7.13	7.28	—.15	—1.15
Lang. Usage	4.14	4.50	—.36	—1.89	7.44	8.50	—1.06	—3.31

The increments of both groups, from initial to final tests, are greater than normal expectation, which is 2.5 grade at the expiration of two and one half years. The gain of the Control group, 3.48 is .33 grade greater than that of the Activity group. This difference is roughly equivalent to 3 months in grade terms. A more detailed analysis of the Modern School Achievement Test results is given in Table 6.

The initial scores of the two groups on the Comprehensive Achievement Test are almost equal. The Activity group gained .18 grade, or approximately 2 months, more than the Control group over the two and one half year period. None of the differences on this test is statistically significant.

Table 6 presents a further analysis of mean and median differences on the Modern School Achievement Test, by sub-tests. It is necessary to consider both mean and median scores on this test because of a peculiarity in its scoring which is resistant to adequate statistical treatment.

Analysis of mean scores for both 4A and 6B test periods indicates that the principal difference occurs in Arithmetic. The Control group obtained significantly higher mean

scores in both Arithmetic Computation and Arithmetic Reasoning at the initial and final testing.

The statistics based on medians are of the same order as those based on means, but tend to magnify the differences. The critical ratio for Reading Speed in grade 4A and for Reading Speed, and Language Usage, as well as the Arithmetic scores in grade 6B are significant when computed on the basis of median differences.

Discussion

In evaluating the significance of the results presented above, on the Modern School Achievement Test, it is necessary to recognize that the initial matching of groups, with respect to this test, was not so close as that on the Comprehensive Achievement Test. The Control group mean score was .18 grade higher than that of the Activity group in grade 4A and the corresponding median score, .31 grade higher. The Control group mean scores for the sub-tests range from .08 grade lower, on Spelling to .42 higher, on Arithmetic Computation and the corresponding median scores range from .18 lower on Spelling to .46 higher, on Arithmetic Reasoning.

Analysis of Table 6 shows that the increases from 4A to 6B are proportional to initial advantage. To the extent that this tendency is operative, the greater increases made by the Control group on the Modern School Achievement Test may be due to greater capacity for improvement as a function of greater initial mastery of the material, in addition to any differential effect of school practices.

Conclusion

The results of this study are similar to those of Study I and confirm, in general, the pattern observed in previous reports using the three tests employed. The data on the Modern School Achievement Test, while indicating significantly greater gains for the Control group at the end of two and one half years, must be discounted because of the imperfect matching of groups on this test. Analysis of the data of Table 6 suggests that population differences, as reflected by the higher initial standing of the Control group on the Modern School Achievement Test, may account for the results.

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A COMPARATIVE STUDY OF THE WORRIES OF CHILDREN IN TWO SCHOOL SITUATIONS

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This study reports results obtained by means of a "What Do You Worry About?" inventory that was administered to fifth and sixth grade pupils in the New York City Elementary Schools.*

Population Studied. The pupils represented two groups of schools. Schools in one group had officially adopted, and were putting into practice, an "activity" program, based upon "progressive" or newer theories of education. This experiment with newer educational practices has been described in several earlier publications.** In the other group were schools that had not officially adopted the activity program and, to varying degrees, maintained the conventional program. The present study represents a minor undertaking in connection with series of more comprehensive investigations of the activity and control schools.

The extent of the difference between the two groups of schools has been studied by various means in earlier investigations.*** The findings in all of these studies show significant differences in many particulars between representative schools in the two groups. These differences are, of course, more marked in the case of some pairs of classes than in the case of others, but, by and large, the differences are quite substantial. In general it may be said that the activity classes are less formal, offer more freedom for children to express themselves, to exercise their interests and initiative, to work on independent projects, to participate more freely in the planning and execution of the work of the class.

It was partly by virtue of these demonstrated differences that the present study was undertaken to find whether there might be differences in the amount of emotional tension or strain associated with the two educational regimes, as revealed by children's own reports concerning their "worries".

The pupils in the present study represent a selection of one class at the fifth and sixth grade levels in each of eight pairs activity and control schools. In each school in which there were two or more classes at the fifth or the sixth grade levels, the principal was asked to designate the class that represented the highest average ability. In other words, the pupils here involved are somewhat superior to the average fifth and sixth grade public school populations, although this degree of selectivity is perhaps not a very important factor, for several reasons. In some instances there was not a significant difference between the class that was selected and other classes at the same grade level. Apart from this, the factor of academic ability is perhaps less important, as far as worries are concerned, than other uncontrolled factors, such as the personality of the teacher, the rapport that existed between the pupils and the teacher, the homogeniety of the groups, the morale of the class, and so forth.

The children included in the study number 569 boys and girls in activity classes and 555 in control classes.

The "Worries Inventory". The instrument that was used was in the nature of a mimeographed paper-and-pencil test. The first page included directions, and following this was a list of twenty-five items, each representing a situation or condition that might possibly be

* The evaluation was conducted with the aid of workers of the Work Projects Administration, Research and Records Programs District Office, Research Survey and Federal Data Section. Official Project No. 65-1-97-21 WP 10, Sub 1.

** See, e.g., Loftus, John J. "New York City's Large-Scale Experimentation with an Activity Program: A Metropolitan School System Takes Stock", *Progressive Education* (February, 1940).

*** See, e.g., Jersild, Thorndike, Goldman and Loftus, this Journal, Dec. 1939. More detailed information concerning differences in schools involved in the present investigation is provided in unpublished studies, one of which is based upon systematic observations of the "working day" in the two sets of schools, and another of which deals with characteristics of the participation by pupils in the work of the class.

TABLE I

WORRIES OF FIFTH AND SIXTH GRADE CHILDREN IN ACTIVITY AND CONTROL SCHOOLS AS REVEALED BY THEIR RESPONSES TO THE ITEMS OF A "WHAT DO YOU WORRY ABOUT" TEST

	BOYS								GIRLS							
	Activity N=287 % responding				Control N=307 % responding				Activity N=282 % responding				Control N=248 % responding			
	Often	Sometimes	Often or Sometimes	Never	Often	Sometimes	Often or Sometimes	Never	Often	Sometimes	Often or Sometimes	Never	Often	Sometimes	Often or Sometimes	Never
Items Relating to School																
Failing a test	15	73	87	13	13	71	83	17	17	76	93	7	14	72	86	14
Being late for school	15	47	62	38	16	48	64	36	15	54	69	31	15	50	65	35
Being scolded by teacher	6	63	**69**	31	9	53	**62**	38	9	59	**68**	32	6	58	**64**	36
Being left back in school	17	41	58	42	22	27	49	51	15	39	54	46	15	38	53	47
Being poor in spelling	19	41	60	40	13	43	56	44	13	38	51	49	9	35	44	56
Being called on by teacher to answer questions	11	39	50	50	15	44	59	41	4	45	49	51	9	43	52	48
Being poor in reading	7	37	44	56	9	41	50	50	7	36	43	57	7	31	38	62
Having a poor report card	16	58	**74**	26	16	48	**64**	36	23	56	**79**	21	13	52	**65**	35
Being told you are wrong by other pupils	5	44	49	51	7	42	49	51	5	37	42	58	2	38	40	60
Not doing as well as other children	12	57	69	31	8	51	59	41	10	56	66	34	8	50	58	42
Giving a report in class	10	35	45	55	7	40	47	53	13	31	44	56	3	41	44	56
Being poor in arithmetic	18	49	67	33	13	47	60	40	14	53	67	33	13	51	64	36
Not being good at drawing or printing	12	33	45	55	12	39	51	49	9	37	46	54	9	35	44	56
Non-School Items																
The dreams you have	7	29	**36**	64	10	37	**47**	53	4	30	**34**	66	6	31	**37**	63
Being scolded by father or mother	13	67	**80**	20	11	66	**77**	23	13	66	**79**	21	8	63	**71**	29
Falling or being in a high place	10	32	42	58	11	42	53	47	7	46	53	47	6	43	49	51
Dying or being killed	9	19	28	72	11	24	35	65	11	21	32	68	8	15	23	77
Being made fun of by other children	5	28	33	67	9	31	40	60	4	29	33	67	5	26	31	69
Being bitten by a dog	6	28	34	66	7	27	31	69	6	31	37	63	3	33	36	64
Ghosts, spooks	3	16	19	81	5	18	23	77	4	14	18	82	5	14	19	81
Being kidnapped	5	16	21	79	7	11	18	82	9	23	32	68	5	22	27	73
Strange people following you	5	28	33	67	10	32	42	58	21	34	55	45	9	36	45	55
Being alone in the dark	8	33	41	59	10	36	46	54	11	32	43	57	11	32	43	57
Losing your friends	7	38	45	55	12	44	56	44	9	44	53	47	5	42	47	53
Being hit by rough children	3	42	45	55	9	42	51	49	9	32	41	59	5	31	36	64
Average of all items relating to school	13	47	**60**	40	12	**46**	58	42	11	47	**58**	42	9	**46**	55	45
Average of all items not relating to school	7	31	38	62	9	**34**	43	57	9	34	**43**	57	6	**32**	38	62

a source of worry. Following each such item were the words, "Often", "Sometimes", "Never". The child was instructed to underscore the word that best described the extent to which the child worried about the item in question.

The list of "worries" was especially designed to include some items (13 in all) that were related mainly to life at school (such as failing a test) as distinguished from items (12 in all) that related primarily to life out of school (such as being alone in the dark). The specific items are shown in the table that follows. Many of the items in the inventory were taken from a list devised and used by Pintner and Lev.[1] Others were adapted from one of the writer's studies of children's fears.[2]

Results

As can be seen in Table I, tallies were made of responses to each item and separate percentages were computed for each item. Averages are also shown for items relating primarily to school and for items relating mainly to life outside of school. Table I shows results separately for boys and girls, for the fifth and sixth grades combined. Separate tables were similarly prepared for each grade level, but these are not here reproduced. The results for the separate grade levels will be referred to, however, in the discussion that follows.

It can be noted that the averages of percentages shown for all items relating to school reveal no substantial differences between the activity and the control groups. In the case of the boys, the differences are quite negligible. In the case of the girls, the percentage responses denoting that the children "often" or "sometimes" worry is somewhat larger in the activity than in the control column. This apparent tendency on the part of girls to worry more, as revealed by results for the two grades combined, was also shown, in both tables, when results were separately computed for the fifth and sixth grades. In all the comparisons, however, the differences are rather small.

From inspection of Table I it can be noted that the activity and control groups are quite similar not only as far as the averages are concerned but also with respect to individual items of the inventory. In the case both of boys and of girls, in both groups, the situation concerning which the largest percentage of children often or sometimes worry is failing a test. Being scolded by father or mother ranks next (or, as in one group, is tied for second place). Similarly, in both the activity and the control groups, and in the case both of boys and of girls, having a poor report card and being scolded by the teacher rank among the five most prominent worries.

It can also be noted, incidentally, that such differences as do appear are more apparent in comparisons between boys and girls, within either of the two groups, than between boys in the activity and the control groups, or between girls in the activity and control groups. (Rank-difference correlations between the responses of the various groups follow: between activity and control boys, .93; between activity and control girls, .98; between activity boys and activity girls, .87; between control boys and control girls, .90). Even in the case of comparisons between boys and girls, it can be noted, the differences are relatively small; the differences appear mainly in connection with a few items; girls, for example, report relatively more worries than do boys concerning "Being followed by strange people" and boys report a higher percentage of worries than do the girls concerning "Being hit by rough children".

It is interesting to note that in both groups the percentage of children who report that they sometimes or often worry about being scolded by father or mother is somewhat larger than the percentage reporting worries about being scolded by the teacher. It appears that parental wrath is more terrifying than the wrath of the teacher; however, as already noted, scoldings by the teacher also rank high as occasions for worry.

The item, "Having a poor report card", likewise is a prominent source of worry in both groups. It is likely that, in many cases, worry concerning this situation is due in large measure to the reaction at home to a poor report card; to the extent that this is true, the item might perhaps properly be classed with out-of-school worries. In any event, it does not appear that the practices associated with the activity program have rendered pupils less anxious concerning reports that the school sends to the parents.

[1] Pintner, R. and Lev, J. "Worries of School Children", *Journal of Genetic Psychology*, LVI (1940), pp. 67–76.

[2] See especially Jersild, Arthur T. and Holmes, Frances B. *Children's Fears*, Child Development Monographs, No. 20 (New York: Bureau of Publications, Teachers College, Columbia University, 1935).

The responses to items dealing with arithmetic, spelling and reading are of some interest, in view of the fact that these subjects are emphasized relatively less (at least as far as time spent on them by the entire class is concerned) in the activity than in the control classes. In the case of arithmetic, the activity and control children report substantially the same amount of worry; in the case of spelling and reading, all comparisons show that the activity children report slightly more worry. It appears, in other words, that the greater amount of time diverted to other undertakings in the activity schools (notably the greater amount of time spent on arts and crafts) has not relieved pupils of tensions connected with these conventional school subjects. It is likely that the findings here reflect the fact that the activity teachers, while striving to carry on with projects peculiar to an activity program, are also under pressure to keep their pupils up to standard in the conventional subject matter skills.

The two groups show no notable differences in their responses to items concerning the relations of the pupils with one another. The item, "Not doing as well as other children", which to some extent, perhaps, reflects competitive pressures, ranks high as a source of worry in both groups. The item, "Being told by other pupils that you are wrong", is reported as a source of worry by a somewhat larger percentage of boys and girls (49%) in activity classes than of boys and girls in control classes (42 and 40 per cent respectively). The difference here, which is small, is perhaps due to the fact that by reason of the greater informality in the activity classes there is more frequent occasion for criticisms from other pupils. In any event, it appears that a substantial proportion of activity pupils have not, in the process of give and take with other pupils, become nonchalant with respect to such criticisms.

Summary

A "Worries Inventory", including 13 items relating primarily to school activities and 12 items relating primarily to out-of-school situations, was administered to 1124 children in grades five and six in eight pairs of New York City elementary schools. These schools included eight that had officially adopted an activity program, representing an effort to apply newer or progressive procedures, and eight other schools that were not involved in the experiment with the activity program.

The results are shown in detail in Table I. In general, there were no substantial differences between the worries reported by children in activity and non-activity schools. The results are highly similar not only when treated from the point of view of the averages of all items, but also when treated from the point of view of individual items.

A slightly (but negligibly) higher percentage of activity pupils report that they "often" or "sometimes" worry about matters pertaining to school (such as being scolded by the teacher, failing a test, being poor in arithmetic, having a poor report card). It appears that the activity program, which has entailed many changes in classroom procedures, including greater freedom for the individual pupils to exercise their interests, has not rendered the pupils less concerned about their progress and competence in school work.

The situation which the largest percentage of children in both groups reported that they worried about was "Failing a test". Over 80% reported that they "often" or "sometimes" worried about this matter. In the various groups, from 71% to 80% reported that they "often" or "sometimes" worried about "Being scolded by father or mother". "Having a poor report card" was reported as a topic of worry by 64 to 79% of the children in the various groups, and "Being scolded by the teacher" was reported as a worry by 62 to 69%.

Many of the items relating primarily to life out-of-school (such as ghosts, being kidnapped, dreams, dying, strange people) were reported as less frequent topics of worry than items relating to failure in the work at school.

CHANGING CONCEPTIONS OF TOPIC ILLUSTRATIONS IN GENERAL SCIENCE TEXTBOOKS[1] (1911-1934)

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Irvington, N. J.

PROBLEM

All teachers of general science recognize the value and relative importance of pictures to general science textbooks. The purpose of this study, then, will be to determine the changes from 1911 through 1934 in the degree of attention given to topics illustrated by pictures. This investigation is confined wholly to the topic, "Air."

TECHNIQUE OF STUDY

Some more or less arbitrary criteria of selection had to be set up to reduce the number of contributing sources of data sufficiently to make the investigation practicable.

[1] A portion of this study appeared in *The Journal of Experimental Education*, V (June, 1937), pp. 368–372. Figures are substituted for tables in the present paper.

The selection, therefore, was based primarily upon the availability and wide use of the eighteen general science textbooks listed.

For ease of interpretation, the twenty-four years included in this analysis have been divided into four periods as indicated. General science textbooks of four publishers were used for each period. It is interesting to note that in the last period (1929–34) one publisher brought out a three-book series which, for convenience, will be regarded as a unit. In this article, reference will be made to the sixteen general science textbooks, that is, four for each period.

After a careful analysis of the chapters relating to the topic, "Air," in textbooks investigated, pictures were then classified ac-

PERIOD 1911–16

Textbook	Author	Publisher	Copyright Date
1. First Year Science	Snyder	Allyn and Bacon	1914
2. General Science	Clark	American Book Company	1912
3. General Science	Elhuff	D. C. Heath and Company	1916
4. Introduction to General Science	Rowell	The Macmillan Company	1911

PERIOD 1917–23

1. General Science	Bedford	Allyn and Bacon	1921
2. Civic Science in Home and Community	Hunter and Whitman	American Book Company	1923
3. The Science of Common Things	Tower and Lunt	D. C. Heath and Company	1922
4. An Introduction to the Study of Science	Smith and Jewett	The Macmillan Company	1918

PERIOD 1924–28

1. General Science	Snyder	Allyn and Bacon	1925
2. New Introduction to Science	Clark	American Book Company	1928
3. General Science	Elhuff	D. C. Heath and Company	1925
4. Science of Home and Community	Trafton	The Macmillan Company	1926

PERIOD 1929–34

1. Our Environment: Its Relation to Us (Book I)	Carpenter and Wood	Allyn and Bacon	1933
Our Environment: How We Adapt Ourselves to It (Book II)	Carpenter and Wood	Allyn and Bacon	1934
Our Environment: How We Use and Control It (Book III)	Wood and Carpenter	Allyn and Bacon	1934
2. Problems in General Science	Hunter and Whitman	American Book Company	1934
3. The World About Us	Pulvermacher and Vosburgh	D. C. Heath and Company	1930
4. General Science For Today	Watkins and Bedell	The Macmillan Company	1932

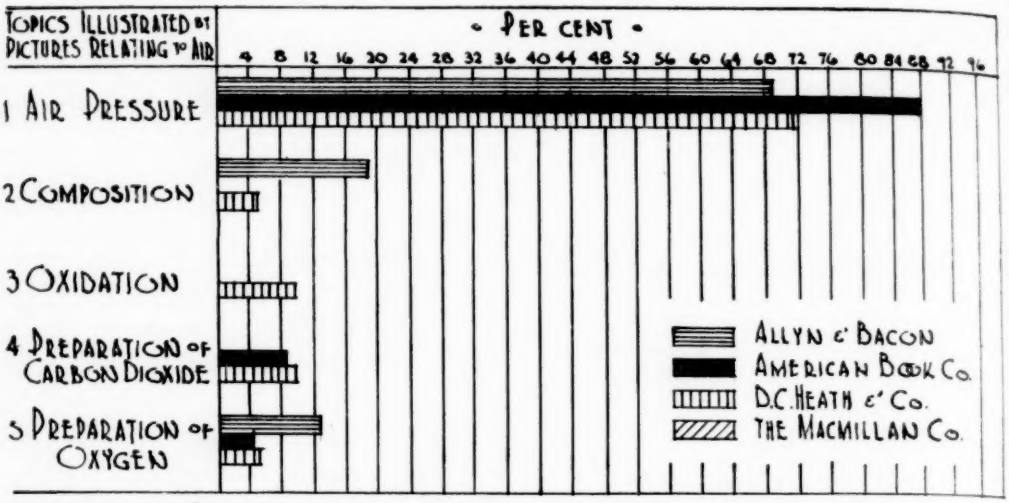
TOPICS ILLUSTRATED BY PICTURES RELATING TO AIR
• PER CENT •
4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 80 84 88 92 96
1 AIR PRESSURE
2 COMPOSITION
3 OXIDATION
4 PREPARATION OF CARBON DIOXIDE
5 PREPARATION OF OXYGEN
ALLYN & BACON
AMERICAN BOOK CO.
D.C. HEATH & CO.
THE MACMILLAN CO.

FIGURE 1 - RELATIVE PERCENTAGES OF PICTURES DEVOTED TO TOPICS RELATING TO AIR IN FOUR GENERAL SCIENCE TEXTBOOKS PUBLISHED 1911-1916.

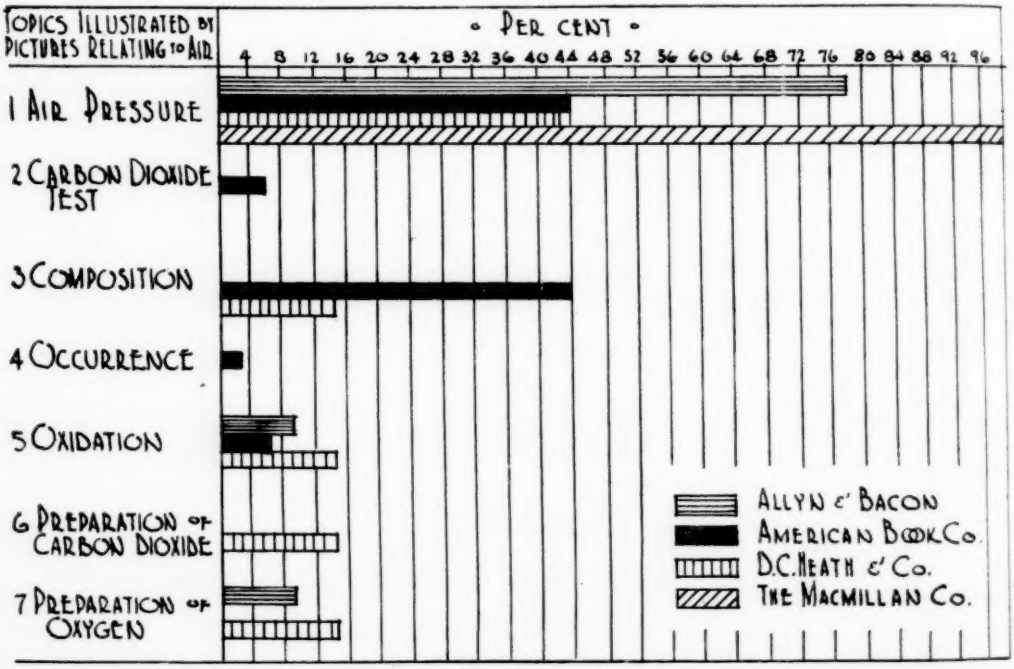
TOPICS ILLUSTRATED BY PICTURES RELATING TO AIR
• PER CENT •
4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 80 84 88 92 96
1 AIR PRESSURE
2 CARBON DIOXIDE TEST
3 COMPOSITION
4 OCCURRENCE
5 OXIDATION
6 PREPARATION OF CARBON DIOXIDE
7 PREPARATION OF OXYGEN
ALLYN & BACON
AMERICAN BOOK CO.
D.C. HEATH & CO.
THE MACMILLAN CO.

FIGURE 2 - RELATIVE PERCENTAGES OF PICTURES DEVOTED TO TOPICS RELATING TO AIR IN FOUR GENERAL SCIENCE TEXTBOOKS PUBLISHED 1917-1923.

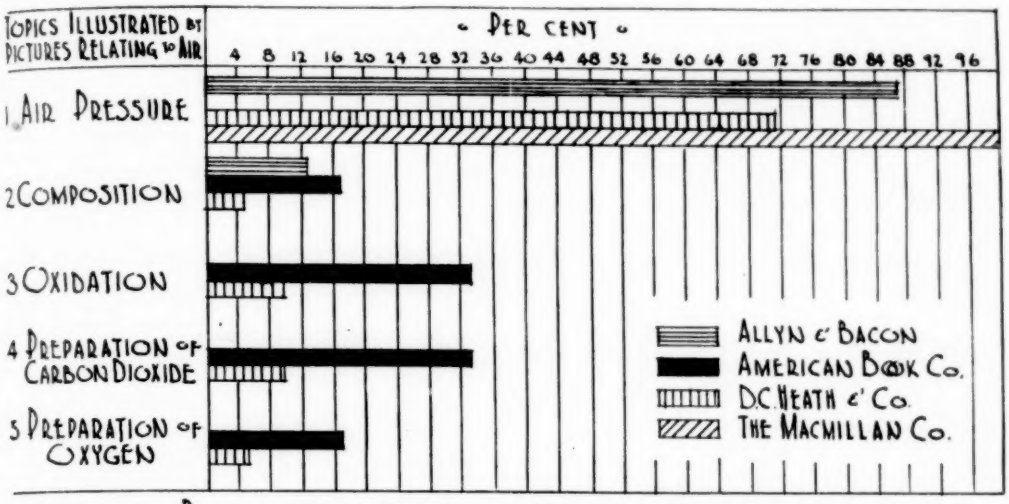
TOPICS ILLUSTRATED BY PICTURES RELATING TO AIR
PER CENT
4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 80 84 88 92 96
1 AIR PRESSURE
2 COMPOSITION
3 OXIDATION
4 PREPARATION OF CARBON DIOXIDE
5 PREPARATION OF OXYGEN
ALLYN & BACON
AMERICAN BOOK CO.
D.C. HEATH & CO.
THE MACMILLAN CO.

FIGURE 3 - RELATIVE PERCENTAGES OF PICTURES DEVOTED TO TOPICS RELATING TO AIR IN FOUR GENERAL SCIENCE TEXTBOOKS PUBLISHED 1924-1928.

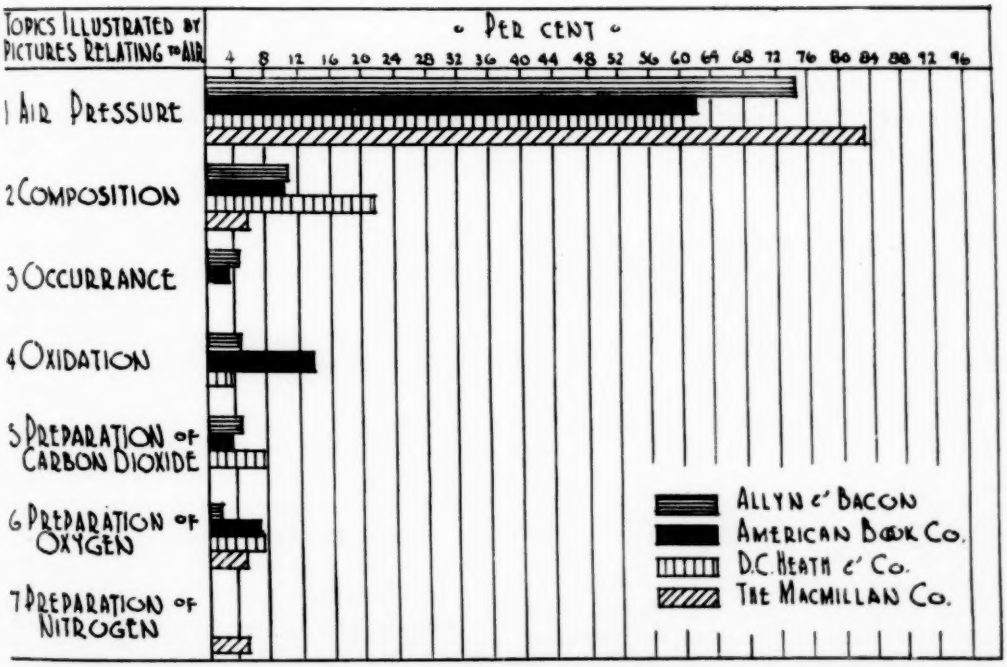
TOPICS ILLUSTRATED BY PICTURES RELATING TO AIR
PER CENT
4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 80 84 88 92 96
1 AIR PRESSURE
2 COMPOSITION
3 OCCURRANCE
4 OXIDATION
5 PREPARATION OF CARBON DIOXIDE
6 PREPARATION OF OXYGEN
7 PREPARATION OF NITROGEN
ALLYN & BACON
AMERICAN BOOK CO.
D.C. HEATH & CO.
THE MACMILLAN CO.

FIGURE 4 - RELATIVE PERCENTAGES OF PICTURES DEVOTED TO TOPICS RELATING TO AIR IN FOUR GENERAL SCIENCE TEXTBOOKS PUBLISHED 1929-1934.

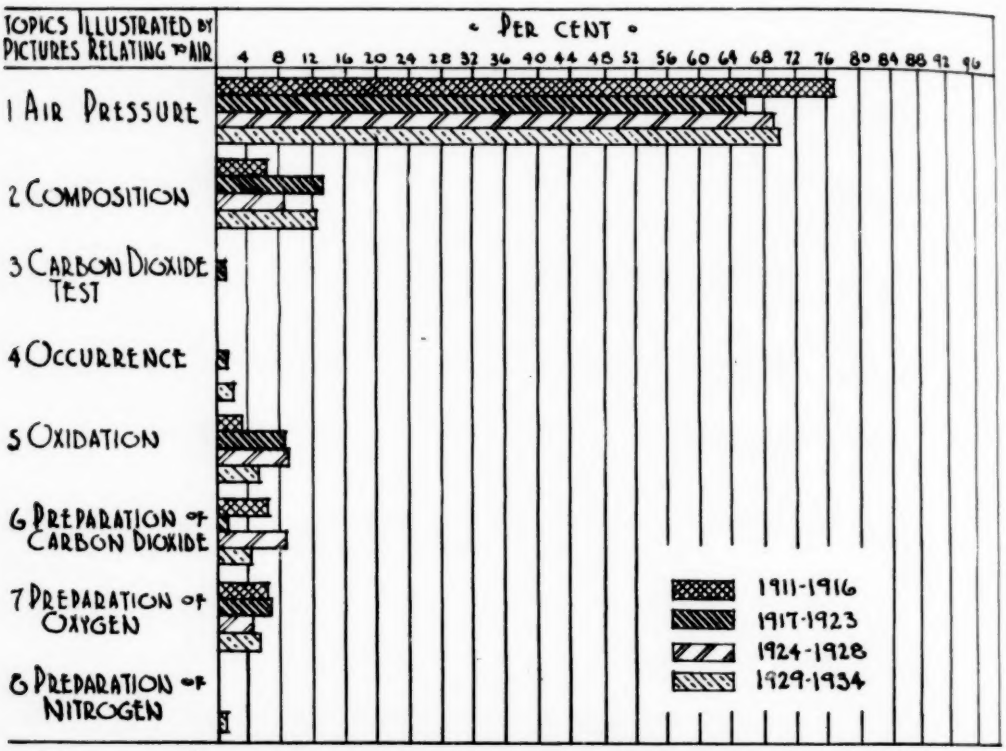
TOPICS ILLUSTRATED BY PICTURES RELATING TO AIR
• PER CENT •
4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 80 84 88 92 96
1 AIR PRESSURE
2 COMPOSITION
3 CARBON DIOXIDE TEST
4 OCCURRENCE
5 OXIDATION
6 PREPARATION OF CARBON DIOXIDE
7 PREPARATION OF OXYGEN
8 PREPARATION OF NITROGEN
1911-1916
1917-1923
1924-1928
1929-1934

FIGURE 5 - RELATIVE PERCENTAGES OF PICTURES DEVOTED TO TOPICS RELATING TO AIR IN FOUR GENERAL SCIENCE TEXTBOOKS PUBLISHED OVER FOUR PERIODS: 1911-1916, 1917-1923, 1924-1928, 1929-1934.

cording to the specific topic represented. These data were tabulated as to periods in four tables[2] for the purpose of showing a frequency of the illustrated topic. From these findings graphs were constructed revealing the same facts as that of the tables. A fifth figure has been included indicating a picture percentage comparison of "Air" for the four periods.

Summary and Conclusions

All of the pictures dealing with "Air" were classified according to the specific topic illustrated. The following is a list of topics illustrated by pictures found in the general science textbooks investigated: (1) "Air Pressure;" (2) "Composition;" (3) "Occurrence;" (4) "Oxidation;" (5) "Preparation of Carbon Dioxide;" (6) "Preparation of Nitrogen;" and (7) "Preparation of Oxygen."

To summarize briefly: Illustrations of the topic, "Air Pressure," are predominant with 70 per cent of the total number of pictures related to it. The lowest per cent for the pictures dealing with "Air Pressure" is 42.8 while the highest is 100. Most of the percentages, however, are greater than 60. Some books used no other illustrations concerning air. The reason for this is probably the important part that air pressure plays in relation to the airplane and the caisson.

With respect to the remainder of pictures pertaining to "Composition," "Oxidation," "Preparation of Carbon Dioxide," and "Preparation of Oxygen," there is agreement to a large extent as to the few pictures inserted in textbooks.

[2] Simmons, Maitland P. "Changing Conception of Topic Illustrations in General Science Textbooks (1911–1934)", *The Journal of Experimental Education*, V (June, 1937), pp. 370–371.

The topics, "Carbon Dioxide Test," "Occurrence," and "Preparation of Nitrogen," were not given such consideration and in some texts did not appear at all. The small number of these illustrations indicate their relative unimportance.

It is a significant note that *Introduction to General Science* by Rowell, published by The Macmillan Company in 1911, reveals an entire lack of any type of pictures or diagram.

General Recommendations

The findings of this investigation reveal the topic, "Air Pressure," as the one receiving the greatest amount of attention. The remainder of the illustrations on "Air" is not sufficiently important to be worthy of comment. In the light of these facts, it is, therefore, recommended that teachers introduce other pictures to make the various phases of general science more meaningful.

ON LEARNING ABILITIES OF CHILDREN AS RECORDED IN A DRAWING EXPERIMENT: I. SUBJECT MATTER

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INTRODUCTION

Some of the causes for success or failure in the visual arts can be found in important factors such as: analytical perception; ready recall of mnemonic pictures; incongruity between memory pictures and drawn pictures;[2] variety and fluency of graphic symbols; or predominance of the visual component in absorbing and producing art.

It is conceivable that changes and developments can be brought about by stimulation either through exposure to selected works of art or through guidance in a specific direction, or through both.[3]

The results of this study are reported in two parts. The first part deals with the changes in subject matter through exposure to works of art. The second part deals with the aesthetic approach, and its significance lies in the differences of reaction between average and specially gifted children and the inferences therefrom. Hence we wish to draw particular attention to the second part of this study.

THE PROBLEM

We wished to observe changes of attitude which children of all school age-levels undergo, when they are exposed to a stimulus situation. Their reaction was to be studied in their drawing achievement.

Several questions of principal interest can be answered by the results of an experiment of this type, such as: Does the situation act as a stimulus? And if so, would differences appear between a drawing made before the subject's exposure to the stimulating situation and a drawing made afterwards? Differences would vary in nature and intensity and also in the facility with which the subject was presented.

We must discriminate between differences in content, or subject matter, differences in representation and differences in style and technique. Differences in content, regardless of representation technique or skill, would indicate a general change of attitude on the part of the child. Differences in representation, technique and skill of execution would show a specific influence of the stimulus situation upon the graphic achievement, in which case actual learning processes would take place.

EXPERIMENTAL SET-UP

The subject chosen for the drawings was "Machinery". Twenty-eight stimulating pictures were chosen for the sake of four qualities:

1. Their content, that is, subjects representing directly machinery of some kind, e.g. a steam turbine, electric drills or a steel-hammer plant; or subjects necessitating a representation including machinery, e.g. a factory, a suspension bridge or trains;
2. Their technique, that is, black and white only, either in print-technique, pencil, or pen and ink;
3. Their creation by an artist of the past or a contemporary;
4. The impression of a particular subject by showing a series of them, such as, railroad pictures.

The objectives of the picture demonstration and accompanying talk were three-fold:

1. Stress on the subject chosen by the artist.

[1] This work was carried out under a grant of the General Education Board of New York, to the Educational Department of the Cleveland Museum of Art. I am greatly indebted to Dr. Thomas Munro, Curator of Education of the Cleveland Museum of Art, for his suggestions and his interest in this experiment.

[2] See: Lark-Horovitz, Betty. "Interlinkage of sensory memories in relation to training in drawing", *Journal of General Psychology*, IL (1936), pp. 69–89.

[3] The Cleveland Museum of Art, where this investigation was carried out, emphasizes in its teaching classes art tradition, the "cultural heritage of the past", and endeavors to utilize its collections and contemporary exhibits for creative purposes. For this reason, if for no other, it is of interest, and to some extent necessary, to find out what amount of learning may be gained by using the cultural background and materials of the museum and in which ways both average and specially gifted children respond.

2. Interpretation of the artist's own intention in a short paragraph and reasons for representing this subject in just the way he did, as deduced from the picture.
3. Discussion of the medium which the artist used and the way in which he used it in order to enhance both the subject he represented and his own tendencies.

Hence, a reaction of the audience could be expected either to the subject as such or the tendencial idea pursued in the subject or to the technical treatment or the skillful handling of the medium or a combination of all.

The present study (I) concerns itself with the influence which the stimulus situation exercised on the subject matter of the drawing. Therefore, one can divide questions concerning the content of the drawings and their answers into the following groups:

1. Which principal interests manifest themselves in these chosen subjects? Which subjects were mentioned in the "Directions" which preceded the experiment? Does comparison of the contents of the first and second drawings show a marked shift of interest, that is, change of subject?
2. Did the showing of the picture-slides effect a change of subject in the second drawing and can this influence be traced to one or more specific slides? If so, were the pictures which influenced the second drawing identical with the ones for which the children expressed a preference?
3. Which are the objects, other than machinery, that are represented in both drawings? Is machinery the center or an accessory of the content? Is machinery represented because of its functional values, that is, as construction drafts or the like, or is it treated in its pictorial aspects?

Experimental Procedure

Three-fourths of the children who participated in this experiment are children who attend the Museum's Saturday classes and are drawn from various schools of Greater Cleveland.[4] One-fourth of the children in this experiment came from two Cleveland schools.[5]

The experiment was carried out with 404 children, 6 to 15 years old, the 15 year-old age-level containing a few older children. The children formed two groups: a group of children of average ability in the arts, 172 boys and 191 girls, aged 6 to 15, and a group of specially gifted children, consisting of 21 boys and 20 girls each, 12 to 15 years old. The special group, or "Specials", consisted of children chosen because of their productive abilities which surpass markedly those of average children.[6]

1. Pre-test: The children were asked to make a sketch, using soft black pencils on a 9 x 12 inch sheet of white paper, with a time limit of half an hour. The test was preceded by specific instructions.[7]

[4] About two-thirds of them are of American-born parentage, the other third, though American-born, comes from foreign-born parentage, and comprises ten or more different nationalities. The registrations of all ten-year-old boys on a single Saturday may serve as an example. They showed that these 45 boys came from 29 different schools. All of them were American-born. According to parentage, the distribution was as follows: American—31; English—2; Czechoslovakian—2; Hungarian—2; Lithuanian—1; Mexican—1; Russian—3; Swedish—1; Swiss—1; Ukranian—1. Some of the children attend because they also like to draw, but perhaps more so because their parents are Museum members. The majority of children however, attend the Museum classes solely because they wish to draw. Their attendance is entirely voluntary and is often effected under great handicaps.

[5] We wish to acknowledge with thanks the helpful cooperation of Miss Josephine Arvidson, Principal of Euclid Park School, and of Mr. L. M. Marshall, Principal of Wilbur Wright Junior High School, both of Cleveland, Ohio.

[6] The "special" children referred to in this experiment are selected on the recommendation of their Museum teachers after attending Museum classes for at least one year with unselected children. If the selected child shows promise during a trial period of three months, he joins the special group regularly. The quality of the work of special children is neither uniform nor of the same general quality; most is superior to the average Museum children, but a small number is just a little more promising than the best Averages. The mean IQ of the average group is 108.3, with a range of 60 to 155, while that of the Special is 115, with a range of 89 to 127. The selection of Specials is not necessarily correct, since it is based on the judgment of Museum teachers, and crudely checked by the Meier–Seashore and Lewerenz tests. The Specials averaged very superior to superior, and very superior respectively for each of these two tests.

The groups of special and average children also showed distinctive differences in the quality of their art appreciation during an art appreciation experiment carried out by the writer: see Lark-Horovitz, Betty. "On Art Appreciation of Children: I. Preference of Picture Subjects in General", *Journal of Educational Research*, XXXI (1937), pp. 136–137; II. "Portrait Preference Study", *Journal of Educational Research*, XXXI (1938), p. 598; III. "Textile Pattern Preference Study", *Journal of Educational Research*, XXXIII (1939), p. 35.

[7] Make a drawing of machinery or of some kind of construction where machinery must be used or is being used. You can make any kind you know and like to draw. You can make people working with this machinery or using it. You can make streets, houses, mountains or other scenery with it, if you think it ought to go with machinery.

For example, you may picture a train in the station or going full speed; you may draw ships out at sea or in the harbor, with passengers or without, or loading their goods. You may make a picture of houses and bridges being built with all the machinery and tools used in building; you may make a factory room or engine room with the workmen at work; you may make a bakery with all it needs to bake our bread; you may show the plowing done on the farm; you may make a picture of the machinery and instruments used by doctors in a hospital; you may draw anything that has to do with sewing machines or cooking machinery or any other machinery used in the house; ***or any other kind of machinery you like to draw.***

2. Experimental stimuli: A commentarial talk of twenty minutes duration followed immediately upon completion of the drawing and was illustrated by 28 slides of drawings, etchings, wood and copper engravings, lithographs, paintings, pencils, charcoals, and brush and ink drawings. The instructional talk given to the 6 to 10 year-old children was a simplified edition of the one given to the 11 to 15 year-olds.

3. Post-test: A second sketch was made after a period of a week and was preceded by the same instructions used before, with a time limit up to 1½ hours for the drawing. For this sketch the children had a choice of two paper sizes: 9 x 12 or 12 x 18, and a choice of medium: pencil, or pen, brush and ink. No further explanation, instruction or aid of any kind was given.

4. Incidental observation: Children recorded their preferences for the slides shown in the stimulus situation. This was done on the first and second Saturdays following the completion of the experiment.[8]

Results

The drawings, grouped according to their content, can be divided into those dealing with actual machinery, those that are constructions of some kind or show elements of construction and those that do not represent any machinery.

[8] For this purpose all slides were placed on an illuminated glass-topped table, such as is used in slide departments of libraries. The children thus were able to recall the different slides they had seen previously on the screen and state their first and second choices.

Table I deals with the content of the first drawing and shows the strong interest of the younger group in ships and trains and also in automobiles, the interest of boys in airplanes and of girls in houses. Interests in these various vehicles of transportation prompted 71% of the boys' drawings and 76% of the girls'. The contents of all other drawings cover various subjects.

The older groups' interest in ships and trains is nearly as high as that of the younger group, the boys' interest in airplanes less, the girls' interest higher, the boys' interest in automobiles higher, that of the girls lower. Ships, trains, automobiles and airplanes constitute 80% (boys) and 73% (girls) respectively of the subjects chosen by the older group.

Although constructions of different kinds had been suggested in the directions preceding the experiment, there are very few representations of such subjects in the first drawing.

The directions do not mention airplanes or automobiles. These subjects, however, are chosen in numbers large enough to be significant.

When we compare the subjects chosen after the children had been exposed to the pictures and tendencial talk, with those of the first drawings, and with the subjects of the demonstration picture-slides (Table III), we can see from Table II that the combined percentage of subjects treating of ships, trains, airplanes and automobiles has only slightly decreased for both the younger and

Table I

Subjects Drawn by Younger and Older Groups Before Slides Were Shown (in Percentages)

		Transportation					Actual Machinery					Subjects not dealing with machinery	
		Ships	Trains	Automobiles	Airplanes	Combination of several in one picture	Farm and road machinery	Machinery used in the home	War machinery	Various other machinery	Constructions of various kinds, Bridges	Houses	Others
Younger group (6-10)	Boys	33	15	7	15	1	7½	1	--	2	1	1	2
	Girls	42	12	9	2	--	2	5	--	8*	1	13	4
Older group (11-15)	Boys	30	16	17	12	5	5	--	2	12	2	1	--
	Girls	36½	10	5½	17	4	2	8½	--	7½	1	3	3

* 5% of these are clock pictures

TABLE II

SUBJECTS DRAWN BY YOUNGER AND OLDER GROUPS AFTER SLIDES WERE SHOWN (IN PERCENTAGES)

		Transportation					Actual Machinery					Subjects not dealing with machinery	
		Ships	Trains	Automobiles	Airplanes	Combination of several in one picture	Farm and road machinery	Machinery used in the home	War machinery	Various other machinery	Constructions of various kinds, Bridges	Houses	Others
Younger group (6-10)	Boys	33	14	5½	5½	10	5½	--	--	8	8	2	1
	Girls	52	9	9	2	2	--	2	--	2	3	8	3
Older group (11-15)	Boys	20½	17	7	19	8	3	2	1	2	16	2	1
	Girls	18	21	9	9	3	4	17	2	2	8½	1	2

TABLE III

SUBJECTS REPRESENTED IN PICTURE-SLIDES, ACCORDING TO CONTENT (NUMBERS IDENTIFY SLIDES, SEE ALSO APPENDIX I)

Transportation				Actual Machinery				Constructions Bridges	Factory Buildings		Symbolical Interpretations
Ships	Trains	Automobiles	Airplanes	Farm and Road machinery	Machines in the home	War machinery	Various other machinery		Outside views	Views within	
	20			5			1	11	7	10	
	21						2	12	9		
	22						4	13			
	23						6	14			
	24							15			
	25							16			
	26							17			
	27							18			
	28							19			

older groups; younger group: boys 68%, girls 74%; older group: boys 71%, girls 60½%.

The interest in subjects concerning constructions of some kind has markedly increased in both age-groups, especially in the older one. It is increased from 1% of the younger group to 5½%, and from 1½% of the older group to 12%.

In this connection it must be pointed out that repetition of the directions after only one week may have strengthened the impression, though the wording which preceded both drawings was the same. Also, after the completion of the first drawing, train pictures were shown in a series, thus greatly emphasizing this subject matter. On the other hand, no pictures of ships were shown at all, thus this subject was completely ignored in the demonstration.

With the exception of the group of girls, trains which were emphasized in the stimulus situation did not receive more attention in the second drawing than in the first. The older group of girls' train drawings increased

to double the number, while their ship subjects decreased to one-half.

Since transportation subjects: ships, trains, airplanes, automobiles and combinations of these into one drawing, formed the content of about the same number of drawings of both the first (75%) and second (68%) sketches, since Table IV, moreover, shows that the majority of both groups changed their subject in the second drawing, it is evident that

TABLE IV

CHANGE OF SUBJECT IN SECOND DRAWING

	Boys	Girls
Younger group (6–10)	64%	60%
Older groups (11–15)	75%	75%

the change of subjects took place within the group of transportation subjects, that is, ship-subjects were shifted to train or airplane subjects, and vice versa. In other words, though the actual content of the picture changed, the interest, in this case, is the same but represented through another similar subject.

The only noticeable change of subject in the second drawing is the one relating to the representation of bridges and bridge constructions. Very few of these subjects were made in the first drawings, regardless of age-group or sex. The percentage of drawings showing or indicating constructions, most of which were bridges, is five times as large in the second drawings of the younger group and twelve times as large in those of the older groups than in the first drawings of both. Here, apparently, the pictures dealing with constructions, especially bridges, were influential.

TABLE V

PERCENTAGE OF CHILDREN WHOSE SECOND DRAWING SHOWS SLIDE-INFLUENCE

	Boys	Girls
Younger group (6–10)	16%	5%
Older group (11–15)	18%	16%

Table V shows the percentages of children whose second drawings were influenced by slides. Boys seem more susceptible than girls, and the older group more open to suggestions than the younger ones, but, on the whole, the influence of the pictures is very moderate.

The influence of the pictures is restricted almost entirely to influence on the subject matter. Further analysis of the influence of the pictures shows that, of the total of influencing pictures, the group of slides representing bridge constructions exercised the strongest influence. However, with the exception of No. 28, the influence of which is distinctly traceable in a number of drawings, one can only state the fact of the influence of this group of pictures. The influence of single slides is confined to a few scattered drawings, among children of every age-level.

Slide No. 28 represents the most influential picture. It was shown as the last of the series of train pictures. Since it represents a train speeding over a very high bridge, through the supports of which one can see a Black Forest landscape, it was shown with the train pictures, in spite of the fact that the train looks very diminutive. All children, however, noticed the train. The text of the talk drew attention to the landscape and the train which carries the traveller through it, and to the picture's technique, but it did not emphasize the enormous height of the bridge. All other bridge pictures accentuate either the construction work in building a bridge, or its structure. Picture 28 exercised the greatest influence. Its preference, however, cannot be compared to that of Nos. 7, 20, or 22.

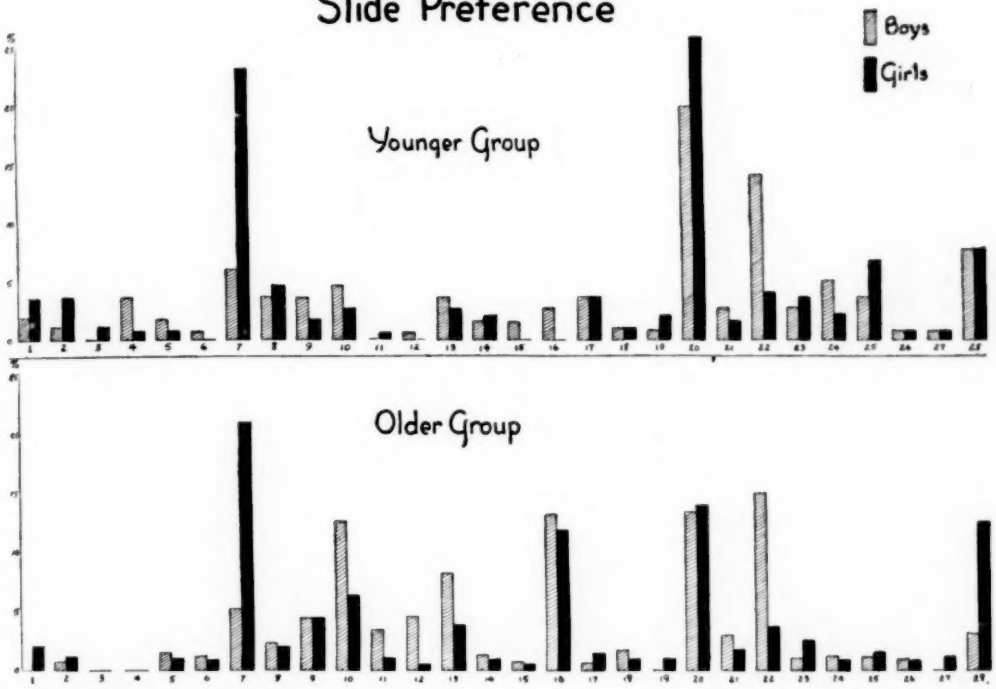
Graph I represents the slide preferences of both the younger and older groups. One picture out of the 28 which were shown was preferred to all others by both groups, and by both boys and girls (No. 20). Both younger and older boys prefer one picture in which girls are not interested (No. 22). Both younger and older girls prefer one picture in which boys are not interested (No. 7). There exists a slight preference for picture No. 28 among the younger groups. This preference takes third place among the older girls.

Comparison of individual picture preferences with the contents of the second drawings reveals the following relations.

There were as many train pictures among the second drawings of the boys of both age-groups as there were among the first ones, though not many children who made train pictures in their first drawings did make them in their second drawings and vice versa. Changes in representation were not of a nature to indicate that a particular train picture, such as, for example, Picture 20 or 22,

Graph I

Slide Preference



was responsible for the change of subject. However, there remains the fact that a number ot children changed from ships or automobiles to trains and that the percentage of train subjects in the second drawings of the older girls was doubled, while simultaneously their ship-subjects decreased to half the amount used in the first drawings.

A few of the children's drawings represent subjects which do not have any relation to machinery. They belong mostly to the younger group of girls and represent primarily houses. In the second drawing, subjects of this kind decrease.

Since the subject serving for this experiment is machinery, it is necessary to discriminate between representation of machinery in some form or other as the center of the content of the drawing and its treatment as an accessory; moreover, the question presents itself whether there were more drawings with machinery as composition-center after the showing of the pictures than there were before.

TABLE VI

COMPARISON OF INDIVIDUAL PREFERENCES AND INFLUENCED SECOND DRAWINGS PER INDIVIDUAL

	Number of drawings where influencing picture-slide is also preferred picture		Number of drawings where the subject of the preferred picture apparently influenced subject choice of drawing		Total Number of drawings showing slide-influence		Total number of children	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Younger group (6-10)-------	2	**	4	**	14	5	87	98
Older group (11-15)------	2	3	3	7	15	16	84	93

TABLE VII

PERCENTAGE OF DRAWINGS TREATING MACHINERY AS AN ACCESSORY

	Boys	Girls	
Younger group	**	1%	1st drawing
Older group	2%	**	1st drawing
Younger group	2%	**	2nd drawing
Older group	7%	3%	2nd drawing

In nearly all the drawings, machinery took the central place in the content.

In Table VII we are showing the percentages of drawings, first and second, which treated machinery as an accessory. Compare also with this the percentage of drawings other than machinery, as shown in Tables I and II.

The human figure is more used in first drawings than in the second ones. The group of older girls is an exception.

The younger group uses the human figure in both the first (38%) and second (29%) drawings more than the older group (27% and 28%). The difference, however, is small. This runs contrary to various observations that younger children will contrive to put figures in most any drawings regardless of the subject.

Although the human figure was mentioned in the "directions" in its relation to the subject, the majority of children did not use it. Of the 28 picture-slides, ten show the human figure, three emphasize it. Of the three pictures chosen as favorites, none has figures.

A primary reason for carrying out this experiment was the comparison of drawings of average and specially gifted children and the comparison of the influence of the stimulus situation on these two groups (66 average boys and 71 average girls were compared with 21 special boys and 20 special girls 12 to 15 years old).

In Tables VIII and IX, the contents of the first and second drawings of both groups are compared.

38% of the first drawings of the special boys are transportation subjects, while transportation subjects of the average boys amount to 81%. Though the average boys' transportation subjects decrease to 69% in the second drawing, those of the special boys decrease comparatively still more, that is, to 23%. The average girls' first drawings on this subject were 71%, that of the special girls 25%; in their second drawings the special girls have none, the average girls 53%. In other words: the Specials, as a group, are far less interested in representing various modes of transportation when they portray the subject of machinery. After seeing the picture slides and after exposure to verbal suggestions, their interest in transportation machinery which, to begin with, was slighter than that of the Averages, decreases noticeably in the boys and disappears entirely in the girls.

Instead, we see a strong increase of interest in constructions. This interest was far greater than that of the Averages in the first drawing, but, after exposure to the pictures, grows three times as strong in special boys and seven times as strong in special girls.

The special group introduces also a kind of machinery representation which none of the average group represents, that is, symbolic drawings. One-third of the special girls make such pictures in their first drawings, and half of them, and one-fourth of the boys in their second drawings.

About as many Specials (78%) as Averages (72%) change to a different subject in their second drawing, yet the changes differ in kind. A fundamental change of subject of the average group is noticeable only in their shift toward drawings of various constructions, mainly bridges. Otherwise their change of subject occurs within "transportation". Far more Specials than Averages change their subject, and their changes tend toward drawings of constructions and symbolic representations of machinery.

Table X presents the percentage of drawings of Averages and Specials which were influenced by pictures. From it, it is evident that the picture-display exercised a far greater influence on the Specials than it did on the Averages. The picture-influence is not confined to the subject alone. A single draw-

TABLE VIII**

SUBJECTS DRAWN BY AVERAGE AND SPECIAL GROUPS BEFORE SLIDES WERE SHOWN (IN PERCENTAGES)

	Transportation				Actual Machinery							Not dealing with machinery	
	Automobiles	Boats	Trains	Airplanes	Combination of all	Farm & Road Machinery	Home Machinery	War machinery	Other machinery	Construction of various kinds	Symbolical representation of machinery	Houses	Other
Average Boys	16	29	14½	16	6	1½	--	1½	13	3	--	--	--
Special Boys	--	14	5	14	5	9½	--	--	38	14	--	--	--
Average Girls	5½	40	4½	18	3	1	11	--	7	1	--	4½	4½
Special Girls	--	--	20	--	5	5	--	--	35	5	30	--	--

TABLE IX**

SUBJECTS DRAWN BY AVERAGE AND SPECIAL GROUPS AFTER SLIDES WERE SHOWN (IN PERCENTAGES)

	Transportation				Actual Machinery							Not dealing with machinery	
	Automobiles	Boats	Trains	Airplanes	Combination of all	Farm & Road Machinery	Home Machinery	War machinery	Other machinery	Construction of various kinds	Symbolical representation of machinery	Houses	Other
Average Boys	9	18½	11	21½	9	4½	3	1½	3	20*	--	3	1½
Special Boys	4½	4½	9½	--	4½	--	--	--	4½	43*	24	--	--
Average Girls	7	17	17	8½	4	4½	21	3	3	11*	--	1½	3
Special Girls	--	--	--	--	--	--	10	--	--	35*	50	--	5

* Bridges constitute 69% of these constructions.

** In order to sustain our interpretation and conclusions based on this and some of the following tables, we are giving the standard error differences of:

Tables VIII and IX, "Constructions of various kinds":

Difference of percentage between Drawing I (before slides were shown) and II (after slides were shown):

Averages

(Boys and Girls) $\frac{D}{\sigma_D} = 4.65$ (99.9 chances in 100)

Specials

(Boys and Girls) $\frac{D}{\sigma_D} = 4.22$ (99.9 chances in 100)

Table X:

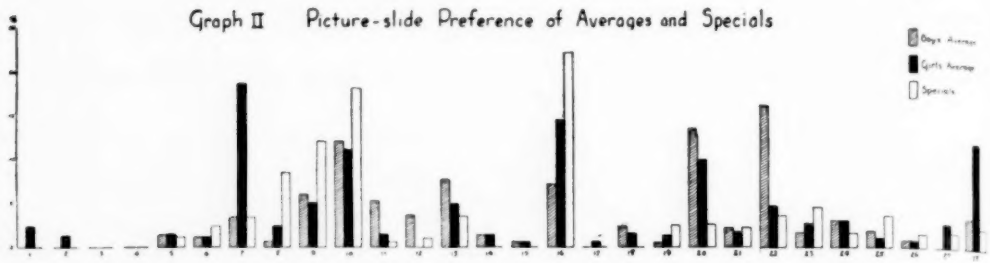
Average Group (Boys and Girls Combined) $\frac{D}{\sigma_D} = 5.43$ (99.9 chances in 100)

Special Group (Boys and Girls Combined) $\frac{D}{\sigma_D} = 8.58$ (99.9 chances in 100)

TABLE X

PERCENTAGE OF 2ND DRAWINGS OF AVERAGES AND SPECIALS WHICH SHOWED PICTURE-INFLUENCE OF SOME KIND

	Boys	Girls
Average group	18%	21%
Special group	67%	60%



ing of a Special may show influence on subject choice, influence on compositional arrangement or on the technique in which the drawing was executed.

The picture preferences of the Specials differ substantially from those of the Averages. Of the slides which exercised an influence on the drawings of the Specials, only the group of bridge slides is worth mentioning separately, since the Specials were more influenced by single elements of various slides. However, here, as with the group of average children, Picture 28 was the most influential single slide.

The best-preferred pictures of the Averages are not those in which the Specials are interested. It is also interesting to notice that the taste of the average boys differs from that of average girls while that of the special boys and girls is so much alike that we recorded it as one group.

Concerning the use of the human figure, there is little difference between the two groups. With the exception of the average girls whose use of figures increases slightly in the second drawing, both groups show a drop in the use of figures in the second drawing.

Interpretation and Conclusion

Differences in the content of one drawing, made before exposure to a stimulus situation and another drawing made after exposure under identical directions tend to indicate general changes of attitude on the part of the child.

They also must be considered as indicative of the child's suggestibility to influence, regardless of his skill in expressing the changes of attitude which the stimulus situation has created.

The subjects especially emphasized in the picture-series were pictures of various constructions of bridges and the like, and train pictures. The shift of subject of second drawings from transportation machinery to constructions as represented by bridges and from ship pictures to train pictures shows that the picture display exercised a certain amount of influence and effected a change of attitude toward the subject. This influence is extremely small concerning the younger group and is mostly reflected in the decrease of those subjects not dealing at all with machinery and their replacement with a subject containing some machinery. In other words, the picture-series helped some of the younger children to grasp the essentials of the subject which they had not done at first.

The influence on the older group is more noticeable, but still remains very moderate. There is no doubt that the older girls changed their ship-subjects to train-subjects under the influence of the train pictures they saw. The results seem to confirm certain observations made in previous appreciation studies, that is, that certain leading interests of children at given age-levels are all absorbing and can be little influenced, if at all, by any artistic values to which these children are exposed.

There appears a noticeable difference of subject choice between Averages and Specials, in particular regarding representation of ideas symbolizing the power or influence of machinery on our ways of living. This difference might lead to the conclusion that there also must exist a difference of interests between the two groups. This interpretation, however, is in contradiction with the subject choices observed in both groups, concerning art appreciation.[9] The second part of this study (II) will demonstrate that the apparent difference of subject choice is due not so much to a difference of interests as to a difference in ability of expression.

[9] See: Lark-Horovitz, Betty. "On Art Appreciation of Children: I. Preference of Picture Subjects in General", *Journal of Educational Research*, XXI (1937), p. 134. "The pictures chosen are nearly the same as those picked by the average children of the same age-levels."

From Table IX it is evident that Specials are far more susceptible to stimulation and, as a result, more open to suggestion. The change of subject, not very noticeable in the drawings of the average group, is very distinct in the drawings of the Specials, and obviously in the direction underlined by the stimulus situation. The shift is toward constructions and bridges, in a greater percentage than that of the Averages, and also toward more symbolism and ideological content. The shift of subject mentioned first is due to the picture-slides, the second, already present in the first drawings may have been strengthened through the verbal comments to the pictures.

Most of the drawings influenced by the picture-slides are not influenced by the pictures which the children like best. It is not very well possible to generalize about groups of which only an average of fifteen drawings showed any traceable influence at all. If we attempt it, we do so with reservations. From the fact that the influencing picture and the preferred picture are not identical, it must be concluded that the preference or liking for a picture is not identical with the impression the picture leaves and its resultant influence. A preference or liking, then, is less apt to create a change of attitude than other factors, which will be discussed in the second part of this study. *If,* however, *the fact described above,* that is, that a preference is not identical with a strong or lasting impression, *were to be proved for a large enough number of cases one would be forced to stress the educational significance of this phenomenon.*

The change of attitude and the influence of the stimulus situation as observed in this experiment must not be regarded in the same way as we would do when dealing with a verbal medium of expression, written or spoken, since the medium itself exercises a selective influence on the subject which is to be represented. This, too, will be shown more fully in the second part of this study.

Summary

Success or failure in the visual arts depends on factors such as analytical perception, ready recall of memnonic pictures; incongruity between memory and drawn picture; variety and fluency of graphic symbols or predominance of the visual component in absorbing and producing art. Knowledge of the influence of such factors on attitudes toward and learning from art materials is necessary to art education in general and to educational departments of museums in particular.

404 children, 6 to 15 years old, and 41 specially gifted children, 11 to 15 years old, were asked to make a pencil drawing of machinery on a 9 x 12 sized paper. Directions for the drawing brought examples of the meaning of machinery. After completion of the drawing, the children were exposed to a stimulus situation consisting of 28 picture-slides representing machinery, and of comments on these slides, stressing the content of the picture, the artist's interpretation and his technique. More particularly, the picture-series contained pictures of various constructions of bridges and a series of train pictures. A week later the same subject was given, with the same directions, the only difference being that the children were given a choice between their former medium, pencil, and another medium, pen (brush) and ink. They also had a choice of larger and smaller sized papers.

The second drawings of both younger and older children showed a moderate shift from the subject most favored in their first drawings, transportation (ships, trains, automobiles or airplanes), to bridge structures, and, within the subject of transportation, a shift from ships (none of which were shown in the picture-series) to trains. Thus the picture-series had a general influence on the content of the children's second drawings and caused a change of attitude in regard to subject matter. This influence is more noticeable in the older group. As regards a more specific influence of the stimulus situation, only a small percentage (younger group 10½%; older group 17%) show an influence which can be traced either to a single picture or to elements in several of the pictures.

There is a noticeable difference between the specially gifted and average children in that the influence of the stimulus situation on the Specials is far greater (63½% compared to 19½% of the Averages). Beside the change of subject, the direction in which the change occurs obviously is indicated by the picture-series.

The influential picture-slides are not the preferred ones. Comparison of the drawings and preferences of each individual make it

Appendix I

Used With Machinery Test, 1936

No. of Slide in order used	Name of Artist	Name of Picture and Date	Technique
1.	Unknown: Greek	Steam turbine, 3rd c. BC	Engraving
2.	Unknown	Glass-making, 15th c.	Engraving
3.	Leonardo da Vinci	Flying-machine	Drawing
4.	Unknown	Water-screw	Wood engraving
5.	Michalek	Electric drill	Crayon with highlights
6.	Silovsky	Steam-hammer	Etching
7.	Metzinger (343)	Red bridge	Painting
8.	Blume (363)	Parade	Painting
9.	Lozowick	Factories	Lithograph
10.	Benton	Steel-workers	Painting
11.	Heilborn	Building a bridge	Lithograph
12.	Rethi	Construction of a lock	Pencil-drawing
13.	Rethi	Building of a suspension bridge	Charcoal-drawing
14.	Brangwyn	Building the bridge	Etching
15.	McCrackin	Hudson River bridge	Brush & ink
16.	Cook	Hudson River bridge	Lithograph
17.	Billings (363)	Machine farms; mural	Mural
18.	Lark	Queensborough bridge	Wood engraving
19.	Schaefer	Iron bridge	Color lithograph
20.	Currier & Ives print	Railroad train	Color lithograph
21.	Pennell	Trains that come and trains that go	Etching
22.	Leighton	Canadian Pacific	Painting
23.	Reimer	Century of German railways	Color lithograph
24.	Helck	Poster—press advertisement for Fisk Tire Company	Lithograph
25.	Alexeieff	Night Scotsman	Water color
26.	Cassandre	Etoile du Nord	Black and white lithograph
27.	Turner	Rain, steam, and speed	Painting
28.	German poster	Black Forest	Color lithograph

clear, for both Averages and Specials, that a preference or liking is less apt than other factors to create a change of attitude.[10, 11]

Appendix II

Commentary on the 28 Slides

You all may be interested to see how other people, artists, represent machinery or the like. I am, therefore, going to show you four groups of pictures:

1. Pictures representing machinery, but made in the past.
2. Pictures made by living artists and showing different kinds of machinery.
3. Pictures made by living artists showing especially bridges and the machinery dealing with their construction.
4. Pictures made by living artists showing railroads and all it may involve.

I want you to look at those pictures with three things in mind: *the subject chosen by the artist, what he tried most to impress through this subject, what medium he used, and how he used it to work out both.*

(1) The first picture belongs to the past; it is a steam turbine, and the type of drawing shows the tendency to hide as much as possible of the machinery, which was considered ugly, unaesthetic by the Greek; therefore the elaborate, animal-shaped legs which support the rotating globe and which are high enough to house a person, necessary to feed the fire.

(2) This drawing about glass-making in the 15th century is a story in several sections, all placed on one picture so as to see it all, showing minutely the tools and how the men —who in this instance take the place of now-a-days machines—handle them. The arrangement, though decorative, is made to show clearly every detail. The sharp-point technique is an adequate help.

(3) These sketches for a flying-machine are much less clear, yet far more suggestive; they are not intended to be a picture, but a

[10] I wish to thank Dr. Irving Lorge, Columbia University, for his interest in this manuscript and for his suggestions concerning its arrangement. I also wish to thank Dr. H. H. Remmers, Purdue University, for reading it.

[11] 64 photographs illustrating drawings characteristic for the results described in this article are on file at the Department of Education (Art Ability Research) of the Cleveland Museum of Art, and are at the disposal of anyone interested in seeing them.

note in pictures, something to be remembered when it comes to more intricate engineering drawings.

(4) This next picture was made in 1548 and has foremost in mind the utility of such a waterscrew and the way it is used. Therefore, note the details, such as the threads of the screw, and also the setup in the background, which in this way puts two pictures on one page. The line technique which is used helps for a clear picture.

Let us look at some machinery pictures of now-living artists, or artists who lived still when your parents were quite young.

(5) Here are the sketches of an electric drill. This machine is used to bore holes into hard stones or rocks. You can see it in operation when houses are built on rocky ground. The utter clearness of the construction is achieved by handling the pencil without smudging, by using a neutral paper and highlights, and most of all because the artist had studied its construction and knew this drill so well that he could draw it frontwise and sidewise with every screw and pin without ever making a mistake.

(6) This etching of a steel-hammer plant is on a different order. You could not learn anything of the machinery itself through it, but you get an impression of how it looks, how people work and may feel in it, of the smoke and blazing heat and noise. The artist used the contrast of large black and whites; he used a needle, yet he also used a chemical with which he can make the sharp lines shade into each other.

(7) Here is a painting of a factory from the outside. No heat, soot, smoke, and blazing lights; but the clean, purposeful construction: machine alone—no life; and to show this up more, the trees even are bare and simplified. The smooth technique is another help to produce this effect.

(8) This modernistic painting parades all sorts of our modern machine life. The idea here is to show a great variety of machines and of what machines have built, yet to show the lack of ornaments and frills in all of them, their stern achievement of the necessary. The technique does the same: smooth colors, uniformity in line, in the massing of light and shade.

(9) Not so with this picture. The simplicity of lines is maintained. Unnecessary details are omitted. But the effect of smoke, of the exclusion of nature,—as the lights come from the blaze inside—of the dreariness, yet greatness of this man-made machinery is put forth; and the technique of soft crayon is used to work out the sooty effect of smoke and dirt and darkness.

(10) Here is a quite different type: here men are in the fore. They and the machine are one. They are equally strong; man needs the machine, and the machine needs man. This is brought out by the artist in making the men look strong, finely built, and the machines clearcut and beautiful in design, and by letting the natural light and the sky permeate the whole.

(11) We turn now to a group of bridge-pictures. This first one, a pencil sketch, stresses the construction. You get a pretty good idea of how this structure is being made, what kind of helping machinery it needs. The actual construction is on the mind of the artist, and he leaves out anything that would draw your attention away from it. Therefore, the clean line technique.

(12) This pencil drawing of a structure for a concrete lock is purposely taken from a high viewpoint. The main impression is that of great height and the entanglement in the depth when digging the water canals, moving dirt and drainage. This has been achieved by making a bird's-view perspective and using a fine-point technique, as well as by keeping away from large pools of darkness.

(13) This picture, a charcoal drawing by the same artist, conveys a different impression: strength, solidity, massiveness, safety. The suspension tower is put forth as the main part; this arrangement helps the effect. The heavy medium, the blackness and solidity of the lines are other successful helps.

(14) This etching makes use of deep shadows melting into each other. Yet the constructive points of the bridge are put forth, but also men, the people who work on the bridge, who pass the bridge, who have some kind of business under the bridge. Again we have the close connection between man and machine; motion, helped by a technique of flickering shadows.

(15) This brush-and-ink drawing is on a different order. The artist, an architect, wants to make you see the line silhouette, the de-

sign of the structure. He therefore omits any shading; it is black against white, without much detail, yet you think of all the detail involved.

(16) This same Hudson River bridge looks very different to the mind of this artist. The construction is finished; we see no more machinery, but this lithograph is suggestive of the machinery which made the bridge. The lines are clean, almost shiny, as is the steel, the bridge is made of. No man—the machine conquered the stream.

(17) And here, a pure picture of machine, it is almost an engineer's draft as to technique. But the arrangement and treatment brings forth the idea. Machine-part builds another machine-part. Man who devises it is invisible, like a God, where machine is his creature.

(18) This bridge in New York only suggests the machinery, with the exception of the cranes and loading ships in the background. This wood-engraving achieves its effect by the purely structural foreground of the bridge and because every detail is or hints at machinery. Black and white are used to bring out this machine effect and nothing else.

(19) The last bridge picture is a German poster, also showing what machinery has achieved, and not the machinery in itself. Only modern methods of working steel can build such a bridge; therefore, the artist shows this up, and the perspective view from underneath is another help to make you conscious of it, and make it conspicuous.

Let us look at the fourth group of machinery pictures of which I spoke: the railroad.

(20) Here is a color print. The colors do not show. They are very gay. At the time of this print, which was an advertising, people were afraid of the railroad. Therefore, picture advertising tried to make a pleasant impression of machine. People could feel confident about it. This is achieved through the neat drawing, the pleasant landscape, the gay colors.

(21) Not so with this etching of a station. Here the proportion of the hall, with its steel structure filled with smoke and steam, conveys noise, something overwhelming. The smallness of the people and even the trains make this still stronger. So does the far-reaching perspective. The technique again works with engulfing blacks, wavering lines, and pools of light.

(22) Here is a poster of a railroad. The engine is the main part of the picture, not only because of the central arrangement, but because of the size, the darkness against the background; even the mountain suggests a comparison—a parallel between the might of nature and the might of machine. Here the variety of shading in the oil paint helps to break a possible monotony and bring out the one big mass in the middle, the engine.

(23) Another poster, but besides the idea of advertising the railroads is the idea of showing the ingenuity of mankind. The speed of the figure makes you think not only of what has been achieved, but of what is going to be achieved. So does the size of the figure compared to the machines. The arrangement combined with the sizes achieves the effect.

(24) This poster has allegoric as well as symbolic meaning. The allegory lies in the suggestion of the modern machine necessary to carry the goods from the factory to the places where they are needed. The wheel, the only thing shown of the railway, looming dark and large in the foreground, means speed, the perpetual movement. The effect here is brought out through contrast and detail of the wheel.

(25) And here is an advertisement of the Flying Scotsman, the pride of the English, because of its speed and comfort. It is a very different effect: the machine here looks friendly, comfortable, and cheerful. This is effected by the scenery, the lovely moonlit night, the mountains and lakes of Scotland moving by, the delicate transparent water-color technique.

(26) Here is a French artist. You might call him thrifty in his drawing. He only puts down the most necessary things to give you the idea. But how well he does it! The rails seemingly stretching into eternity impress you with the endless miles a train speeds through; the switch suggests the different parts of the world. It is machinery too, because without rails there is no railway, just as your left hand helps necessarily your active right.

(27) And now a suggestive picture, an oil painting. The railroad, the engine, the machine, in fact, is only an excuse, or a new

sensation for this artist to paint what he is most interested in: effects of light through the rain and fog. The train and its lighted eye are only a help, a means, for this effect.

(28) This last picture is another German poster. The idea is the same as in the picture before, different though they be. You are shown the beauties of the Black Forest by looking through the lofty bridge. The train only suggests that you might see all this by going on it. The arrangement and the bright clean colors are a helpful technique. Yet this picture impresses you because of the idea suggested through bridge and train, that all this is only possible through our modern machinery.

ON LEARNING ABILITIES OF CHILDREN AS RECORDED IN A DRAWING EXPERIMENT: II. AESTHETIC AND REPRESENTATIONAL QUALITIES

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The Cleveland Museum of Art[1]

INTRODUCTION

In the first part of this article ("Subject Matter"), we discussed the changes concerning the content (subject matter) of children's drawings which can be effected by a stimulus situation. We pointed out that the influence of the stimulus situation will extend to the content of drawings, but would also effect changes peculiar to the medium of expression, in this instance, drawing, and would therefore be recognizable in the representation, composition, technique or skill, or all of these factors. These aspects are being discussed in the present article. We also wish to state again that the investigation of differences of response and achievement between children of average ability and specially gifted children is a primary objective.

EXPERIMENTAL SET-UP AND EXPERIMENT

The experimental set-up and the experiment itself have been described in Part I of this article[2] and can be summarized as follows:

404 children, 6 to 15 years old, (divided into a younger and older group), and 41 specially gifted children, 11 to 15 years old, were asked to make a pencil drawing of machinery on a 9 x 12 sized paper. Directions for the drawing brought examples of the meaning of machinery. After completion of the drawing, the children were exposed to a stimulus situation consisting of 28 picture-slides, representing machinery, and of comments on these slides, stressing the content of the picture, the artist's interpretation and his technique. More particularly, the picture-series contained pictures of various constructions of bridges and a series of train pictures. A week later the same subject was given with the same directions, the only difference being that the children were given a choice between their former medium, pencil, and another medium, pen(brush) and ink. They also had a choice of larger and smaller sized papers.

RESULTS

In this present study we are concerned with differences in representation, compositional arrangement and technique, and with the skill with which the media were handled.

We set out to observe and record a number of factors which can be listed as follows:

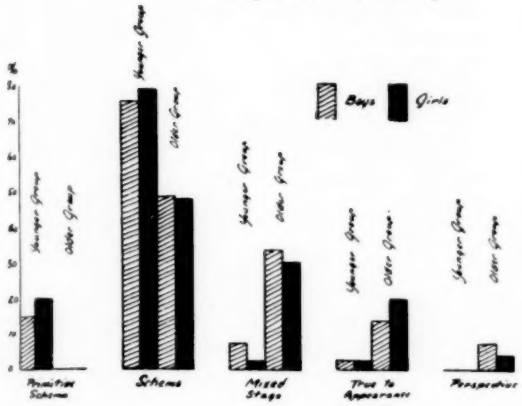
1. The developmental status in drawing of various age-levels and its eventual change in the second drawing.
2. The number of children who use a different medium and paper size, and the influence of a different medium on their representation as compared to their first drawing.
3. The influence of the picture-slides on various qualities in the children's second drawings.
4. Comparison of average and specially gifted children concerning suggestibility, representational development, facileness of expression, curiosity to try a new medium and the results of a combination of the diverse factors mentioned here, as seen in the second drawings.

The developmental status of the younger and older groups is given in the following graph.

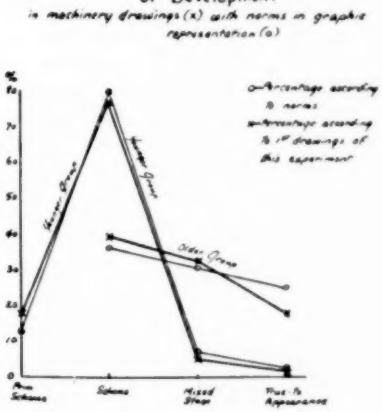
[1] This work was carried out under a grant of the General Education Board of New York, to the Educational Department of the Cleveland Museum of Art. I am greatly indebted to Dr. Thomas Munro, Curator of Education of the Cleveland Museum of Art, for his suggestions and his interest in this experiment.

[2] See: Part I: "Subject Matter", pp. 2 to 7.

Graph I



Graph II


Comparison of Representational Status of Development
in machinery drawings (x) with norms in graphic representation (o)
Schema
Mixed Stage

From this it is evident that half of the older group is still in the schematic stage,[3] that less than one-fifth of the older group's representations are true to appearance[4] and hardly any have reached a developmental stage in which they can represent spatial arrangements in perspective.

Graph IV on page 7, which compares the developmental status of the average and special 15 year-olds, shows that for this, the highest age-level in the older group, the picture of the average child's developmental status is only slightly different, and that this difference applies to the boys only. In other words, inclusion of the eleven and twelve year-olds as a group does not change the developmental status considerably. It remains fairly constant from the age-level 11–12 on, showing a slight increase toward the true-to-appearance stage.

Comparison with norms of development in representation[5] are shown in Graph II.

According to norms, the developmental status of the drawings of the older group in the present experiment is slightly retarded for the true-to-appearance stage.

The second drawings show the shifts of a few individuals either toward a higher developmental stage or, regressively, toward a lower one. The number, however, is so small that it does not effect the total percentages per developmental stage more than by one to four percent. The difference, therefore, is insignificant.

Machinery can be represented graphically in two ways: either pictorially, that is, by showing the appearance of the machinery, its aspect, similar to the portrait of a person, either alone or with surroundings, with or without people; or, it can be shown through the nature of its construction and function, that is, by drawing its parts, making a draft

[3] The schematic stage is one of three principal stages in drawing which are peculiar to children's development. These various stages follow specific laws and can not be changed. Developmental stages of representation can be accelerated to some extent, but they can not be avoided. The order of this development starts with the Scribble Stage, and proceeds through the Primitive Schematic and Schematic Stages, to the True-to-Appearance Stage (with an in-between stage which distinctly combines elements of both) and may or may not end with the perspective stage. The schema and an earlier stage, the primitive schema, is a drawing which represents people, animals or other objects with the help of simplified symbols and outlines which reduce the shape of the represented objects to a combination of ovals, rounds, squares and dots. In the schema the child outlines the different parts of his object separately and unites them by adding one part to the next. It is characteristic of the schema that the child will combine different views of an object into one drawing or different situations into one composition, but as if seen from different points of observation (from a shifting point of vantage). Thus, objects which may be hidden from sight by other objects are nevertheless represented. This kind of picture gives the impression that the child took, mentally, a walk around the obstacle to see what is behind it, and, having found out, draws it.

[4] A representation true-to-appearance endeavors to represent objects as they appear, i.e., in outline, proportion, colors and dimensions which are similar to their appearance. Such a drawing does not yet represent third dimension, and gives an appearance of flatness. Several objects in a picture are assembled in such a way that hidden objects or part of them which cannot be seen simultaneously remain also hidden in the drawing and that a single point of vantage (or observation) is maintained.

[5] These norms for representational development are taken from an analysis of several thousands of children's drawings undertaken by the writer, the material for which had been assembled by Dr. Munro, Curator of the Educational Department of the Cleveland Museum of Art. As one result of this analysis the writer, in collaboration with E. N. Barnhart and E. M. Sills (Lark–Horovitz, Barnhart and Sills: "The Cleveland Museum of Art Graphic Work—Sample Diagnosis", the Cleveland Museum of Art, 1939) established norms which place representational development in relation to chronological age-levels.

or blueprint, or a diagram of its workings, similar to the bone or muscle-man used by anatomy students.

In nearly all drawings the subject was treated pictorially (younger group 97%, older group 98%). Only a negligible percentage attempted functional drawings.

The younger group was more interested than the older group in changing to a new medium, the girls in both groups more than the boys. The same is true of both groups concerning the change to a larger sized drawing.

Considering that the change of medium involves a change of technique, what is the result in regard to the technical treatment? Is the treatment of the new medium superior or inferior[6] to that in the first drawing per individual? Calculating differences of treatment in relation to the number of drawings with changed medium we find that only a small number achieved a treatment of its second drawings which is superior to that of its first. A far greater number is comparatively unsuccessful.

As far as changes in developmental status are concerned in connection with the use of the new medium, we find that there are very few cases and that most of these change toward regression in development. The younger girls form an exception, but the total number is very small.

The influence of the picture-slides on other factors than the actual content of the second drawing is very slight. Apparently whatever influence is exercised relates to the content of the drawing only.

Comparison of the groups of average and specially gifted children reveals differences in

[6] The terms "superior" and "inferior" are used in order to compare consistency of technique with the medium used. This comparison extends only from the second drawing to the first of each individual, (e.g. whether drawing 2 is superior or inferior to drawing 1) but does not compare one individual with another.

TABLE I

CHANGE OF MEDIUM AND PAPER SIZE

	Boys	Girls	
Younger group	41%	50%	Change of medium
Older group	25%	32%	
Younger group	75%	39%	Change in size of drawing
Older group	38%	30%	

TABLE II

SUPERIOR OR INFERIOR TREATMENT OF THE NEW MEDIUM IN THE SECOND DRAWING AS COMPARED TO THE FIRST DRAWING OF EACH INDIVIDUAL

	Boys	Girls	
Younger group	14%	12%	superior treatment
(6-10)	56%	27%	inferior treatment
Older group	14%	10%	superior treatment
(11-15)	29%	50%	inferior treatment

TABLE III

PICTURE-SLIDE INFLUENCE ON COMPOSITIONAL ARRANGEMENT AND TECHNIQUE OF SECOND DRAWINGS

	Compositional arrangement	Technique	Total No. of influenced second drawings	Total No. of children
Younger group				
Boys	1	1	14	87
Girls	--	--	5	98
Older group				
Boys	1	--	15	84
Girls	--	3	16	93

almost every one of the qualities discussed above.

The developmental status of the two groups shows that the majority of the Specials has reached the developmental stage or stages (true-to-appearance and rendering of perspective) which only a small minority of the average group is able to reach. None of the Specials is within the early developmental stage to which the majority of the Averages belongs—the schematic stage (Graph III).

In order to be convinced that the developmental status of the average child is not artificially lowered because of the inclusion of a greater number of younger average children than Specials (50% of the Specials are 15 years old). Graph IV traces the developmental status of the 15 year-olds of both groups. The contrast in development is perhaps still greater.

Shifts toward a higher or lower developmental stage in the second drawing are as infrequent with Specials as they are with Averages.

Regarding the pictorial or non-pictorial representation of the subject, the difference is imperceptible. But there is another aspect of subject treatment, that is, the arrangement of the subject—machinery or construction—within the whole composition. Is the machinery object in the drawing treated as the center of the picture, that is visible as the most important part? Or, are other objects in the drawing treated so as to make them just as, or more important than the real subject? In other words: did the child make a picture of the *machinery* or did he make a *picture* which also contained machinery, but where its importance was not emphasized because it might detract from the pictorial qualities? We can see from Table IV that Specials and Averages differ greatly in this matter.

Nearly all Specials changed their medium while only one-fourth of the Averages did so.

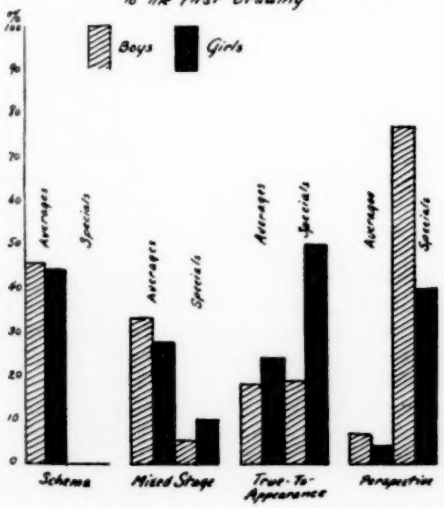
Contrary to this curiosity of almost all Specials to try a new medium, is their nearly unanimous rejection of a larger size for their drawings. One boy out of the 41 boys and girls used the larger size, while one-third of the average children did so.

In reviewing the aesthetic aspects of the second drawing of each individual and comparing them with those of their first one, one notices that the handling of the new medium was less successful than that of the familiar medium on the part of both Specials and Averages.

Of those Averages who show a change of their developmental status in those second drawings which used the new medium, a small

Graph III

Representational Status
of Specials and Averages, according to the first drawing



Graph IV

Representational Status
of 15 year old Averages and Specials

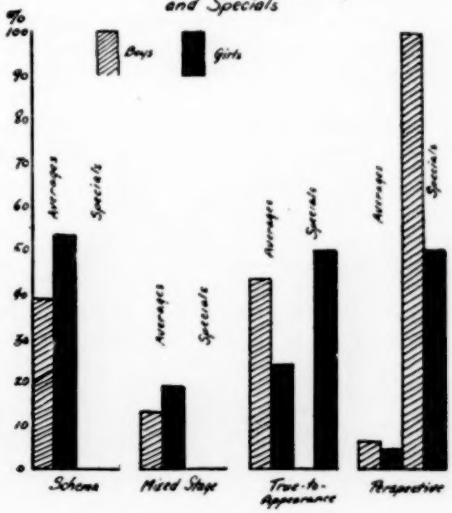


TABLE IV*

MACHINERY TREATED AS AN ACCESSORY (NOT AS THE CENTER OF THE DRAWING)

	Boys	Girls	
Average group	3%	----	1st drawing
	7%	4%	2nd drawing
Special group	10%	25%	1st drawing
	33%	40%	2nd drawing

TABLE V

CHANGE OF MEDIUM

	Boys	Girls
Averages	20%	27%
Specials	90%	96%

TABLE VI

TREATMENT OF NEW MEDIUM WAS MORE OR LESS SUCCESSFUL THAN THAT OF OLD MEDIUM

	Boys	Girls	
Averages	15%	16%	more successful
	23%	53%	less successful
Specials	21%	26%	more successful
	58%	32%	less successful

percentage shows a slight trend toward a more advanced status while a larger percentage shows regression. Of the Specials, the boys' trend is definitely regressive, while the girls show few changes.

The influence of picture-slides other than on the actual content of the second drawing is more pronounced with the Specials than with the Averages. While of the total of influenced drawings of the average group only one-seventh was influenced in regard to qualities which contribute mainly to the aesthetic aspect of a drawing, more than half of the drawings of the Specials were influenced in this respect (Table VII).

INTERPRETATION AND CONCLUSION

The younger group of children participating in this experiment show a developmental status which is almost identical to that found normal for these age-levels, while the developmental status of the older group falls slightly below the norm.[7] The difference between the representational development of the older group in the machinery drawings and that normal to that age-level can be attributed to the fact that the given subject was rather strange to the older group, especially to the girls, while the younger group could indulge in favorites such as boats, trains and airplanes, the kind of subject drawn infrequently, if ever, in school, but frequently drawn outside of school, for fun. The younger group could thus handle their representation with some facility, while the older group was faced with the problem of representing objects with which they were otherwise familiar but in an unfamiliar medium.

The subject of machinery was represented by nearly all children at all age-levels pictorially, that is, in their drawings the children made a picture of the piece of machinery they wished to represent, adding people or some background, all drawn in a fashion which satisfied their developmental status, e.g. schematically. Only a few individuals presented a functional drawing, that is, they drew a cross section of the machine or indicated by means of transparency, lines or a map, the build and workings of their piece of machinery. Nearly all children, regardless of age-level, placed the machinery object of their drawings centrally or in so prominent a place of their compositional arrangement that its importance was obvious. The character of their drawings

[7] The children who participated in this experiment have a similar background and mean IQ to those whose drawings were used for the establishment of the norms referred to previously. A similar group including a number of the same children also participated in Art Appreciation experiments. See: Lark-Horovitz, Betty. "On Art Appreciation of Children: I, II and III", *Journal of Educational Research*, XXXI (1937), pp. 118–137; XXXII (1938), pp. 572–598; XXXIII 1939), pp. 7–35.

TABLE VII*

PICTURE-SLIDE INFLUENCE ON COMPOSITIONAL ARRANGEMENT AND TECHNIQUE AS COMPARED TO SUBJECT MATTER OF SECOND DRAWINGS

	Subject matter	Compositional arrangement	Technique	Total No. influenced drawings	Number of children
Averages:—					
Boys	12	1	--	12	66
Girls	16	--	3	16	71
Specials:—					
Boys	10	1	5	14	21
Girls	10	1	7	12	20

* In order to sustain our interpretation and conclusions based on these tables, we are giving the standard error differences of:

Table IV:
Average Group
(Boys and Girls Combined) $\frac{D}{\sigma_D} = 1.66$ (95 chances in 100)

Special Group
(Boys and Girls Combined) $\frac{D}{\sigma_D} = 3.02$ (99.9 chances in 100)

Change of attitude from first to second drawing:
Average Group
(Boys and Girls Combined) $\frac{D}{\sigma_D} = 2.35$ (99 chances in 100)

Special Group
(Boys and Girls Combined) $\frac{D}{\sigma_D} = 3.11$ (99.9 chances in 100)

Table VII:
For picture-slide influence other than subject matter (compositiona arrangement and technique combined):
Average Group
(Boys and Girls Combined) $\frac{D}{\sigma_D} = 2.00$ (98 chances in 100)

Special Group
(Boys and Girls Combined) $\frac{D}{\sigma_D} = 4.58$ (99.9 chances in 100)

can be termed as a graphic description. Children at all age-levels concentrated on representing the machinery part of their subject without particular interest in any of the aesthetic aspects of their drawings or emphasis to this effect. They were satisfied when their descriptive representation served their subject. This fact becomes more obvious in those second drawings which show picture-slide influence.

This influence manifests itself in the content of the drawings. Practically no influence is exercised on technique or arrangement. The child attempts a poor but fairly exact copy of the picture which impressed him. *The drawing*, hence, *is a graphic description of the fact that one of the picture-slides was especially impressive.* In Picture No. 28, for example, the only individual slide with traceable influence on a number of drawings, a high bridge covers the whole picture so that the top of the bridge is near to the top of the picture. To accentuate the height of the bridge the train which crosses it is diminutive, merely the size of a low railing. The landscape is perceived between the piers of the bridge. The height and loftiness of the bridge caught the imagination of the children; yet both younger and older children were unable to present this essential feature. In their schematic way the younger children came nearer to it than the older ones. Apparently the older children get more distracted by details which hinder them in the representation of the main characteristics, while the younger children, sustained by a schematic representation which is built on essentials (essentials to the child) omit less important details. Another explanation may be helpful in this connection. Younger age-levels

show less interest in pictures of landscapes than they do in some objects represented in pictures[8] and hence the younger children concentrate on their main interest—in our case the high bridge and train—while the older ones' interest is divided between object-interests, e.g. bridge, and landscape-interest. The result is a conflict of interests which hinders them in subordinating the landscape to the bridge, as they must do if they wish to portray its importance and loftiness.

There is a marked difference of attitude between the younger and older group toward the new medium. The younger children seem more curious than the older ones and therefore more of them try the new medium. Much the same is true of the choice of a larger paper size. The use of the new medium, however, reveals that few children attempt a treatment and technique different from their former pencil technique and one more suitable for pen, brush and ink. The smaller children mostly choose brush and ink. In spite of the width of the brush strokes they tried to outline every object, a technique which they use otherwise and which is consistent with the nature of their schematic drawings. Their technique, thus, counteracts their representational intentions, especially when they use a smaller paper size. Most older children used pen (instead of the brush) and ink, and hence were able to follow their tendency of line drawings more successfully than the younger group. It was characteristic of both groups that they transferred their knowledge of the possibilities and limitations of the pencil technique with which they are familiar to the new medium. Therefore, the use of the new medium resulted generally in a treatment inferior to their previous achievement and in some instances in a regression of their developmental status. (See Table II)

In regard to the matter of influence or no influence of the picture-slides on the second drawing, in other words in regard to the susceptibility of children to an artist's representation of the same subject which they themselves represented, we state again, according to Table IV of Part I of this study, that the suggestibility of children at all age-levels is very moderate.

However, one cannot take these figures at their face value. The difficulty of adequate expression in a graphic medium may have been discouraging to a number of children who, although impressed by the one or the other picture they had seen, resorted either to a repetition of the subject of their first drawing or turned to one which they felt assured they could master. The small percentage of influenced girls' drawings of the younger group and the comparatively large number of their non-machinery subjects suggest lack of interest in the given subject and unwillingness to represent it. Moreover, we must consider that the girls showed a preference for picture-slide No. 7, a picture which, though its subject is factories, suggests them only and shows neither smoke nor griminess, and which, by its smooth technique—in contrast to picture-slide No. 9 with its soot and smoke—gives the impression of cleanliness and freshness. Such a choice alone can be interpreted as a protest against the given subject and all this subject stands for, and reflects a general attitude not open to suggestions.

All of the drawings which show picture-slide influence, show it in their subject matter. Of the six drawings which show influence other than on subject matter, three belong to children who may be termed as superior to average, though they do not belong to the special group.

Changes in style could not be observed. Even if no trace of influence were visible, there could still occur a change of style due to the stimulus situation. Yet nothing of this kind is observable. In fact, most children's second drawings can be identified through their first ones, because of the repetition of certain little perculiarities of arrangement and technique.

When we compare the average group of children (12 to 15 years old) with that of the Specials (12 to 15 years old) we can see at once great differences.

There is, first, the difference of development in representation. While only a few of the average group reach a perspective representation and those who reach true-to-appearance representation are far less numerous than the children who remain schematic or in the mixed stage, *no* Special is schematic, only three are in the mixed stage and all others represent their subject true-to-appearance, or in perspective. Though perspective represents a developmental stage

[8] See: Lark-Horovitz, Betty. "On Art Appreciation of Children: I. Preference of Picture Subjects in General", *Journal of Educational Research*, XXXI (1937), p. 133.

which follows true-to-appearance representation, it is difficult to ascertain in every instance whether the drawings of the Specials which are true-to-appearance have or have not reached the perspective stage, since some of them do not need perspective, others are obviously treated in a flat technique which consciously omits perspective.

Advanced development, then, is one of the characteristics which distinguishes the special from the average child. The developmental status of the second drawings is not influenced by the picture-series. It remains the same as in the first. The few regressions which occur and the fewer progressions are due to the use of a new medium and to change of subject. Since development, on the whole, remains static, it follows that this status cannot be advanced by suggestions and instructions, but is part of a wider developmental process. The few regressions which can be observed are due to the struggle with the new medium. They seem to occur in cases where a new developmental stage has barely been reached. The child is unable to represent, in a new and difficult medium, a form he has just mastered. He relapses into a representation which has been familiar to him for a long period. In some of the drawings the change which occurs between the one and the other is that from a perspective representation to a more flat, true-to-appearance one. It is uncertain whether the compositional arrangement and technique are such as to exclude perspective or whether the child is unable to introduce perspective due to the difficulties which the medium presents.

With the exception of four, all Specials chose a pictorial treatment. This is equivalent to the number of Averages choosing pictorial treatment. Thus, there seems to exist no difference in this respect.

The compositional treatment, however, shows differences between the two groups. One-sixth of the Specials treated machinery as an accessory in their first drawings and over one-third did so in their second ones, while the number of Averages using this treatment is quite small for both drawings. This difference in treatment points to fundamental differences in attitude. The average child represents his subject literally, he makes a picture of whatever seems to describe his subject of machinery. Although the slides were such as to attract attention to various other factors which indirectly indicate the subject, he is unable to make use of these finesses if he happens to be conscious of them. The Special, however, seems to observe some of the subtleties of the artist's picture and is sometimes able to introduce them into his own, though otherwise different representation.

Pen or brush and ink was a new medium to both groups. All Specials but three changed their medium while only one-fourth of the Averages did so. The question presents itself whether the Specials are just naturally more curious to try something different, as is also the younger group of children, or whether there is another reason for their behavior. It can be safely assumed that average children do not lack curiosity, but rather self-assurance. A number of children of the average group drew in their schools and were not "Museum children"; they obviously were afraid to fail in what they considered a test of their ability in drawing. The "Museum children" did not have this dread. But even so, there remains a majority of Averages reluctant to try a new medium. Therefore it seems that the average child of these age-levels is conscious of his limitations in graphic expression and needs the support of a familiar medium which he believes he can handle. The Special, on the contrary, feels sure enough of his skill in graphic expression to permit himself the handicap of an unfamiliar medium.

The Specials, with the exception of one, did not use the larger paper size while one-fourth of the Averages did so. Both groups used pen points with some inking-in after the drawings had progressed to a certain point. The result was that the average children spread over a large paper what would have befitted a smaller size and were often unable to complete their drawings or else completed a lay-out which did not cover the whole space. From this procedure and its results it seems obvious that the Average starts without a specific plan and without any idea of what he is able to accomplish during a given time. The Special understands the limitations of a given working time and the relation of the size of the drawing to a specific medium, in this case to pen and ink. The only Special who chose to work on the large size took his first drawing as basis for his second one and used the larger tool, the brush. In other

words, the Specials plan their composition and do not leave it to chance.

In both groups the number of children who are less successful exceeds by far the number of those who were more successful than they had been with the familiar medium. This was checked individually, comparing every individual's second drawing with his first. The resultant greater number of less successful drawings was to be expected. Even so, it is remarkable what some of the Specials were able to do with an unfamiliar medium as compared with the Averages who nearly all failed; so that those among the Averages who apparently were more successful with the new medium than with the old were so only in comparison to their utter failure in their first drawings.

We have mentioned in part I that the Specials were greatly influenced by the stimulus situation. Table X of Part I shows that 63½% of the Specials, that is, two-thirds of the group, were influenced in some way or other, while less than one-fifth of the average group showed any influence. The character of the influence is different too. The influence of picture-slide No. 28 may again serve as an example. The average child who was unmistakably influenced by this particular slide attempts to draw the high bridge and the whole landscape one sees through its piers: trees, mountains and the little house in the valley. But all that the artist exaggerated in order to convey the loftiness of the bridge and its daring structure and next to which everything else looks small, the average child drags down to normal and unimpressive size and shape. He enumerates the objects and sketches the arrangement of the picture, but fails to convey any of the characteristics which made it remarkable. He enumerates but does not analyze. Not so the Special. He may omit some details, but he grasps the essentials: the imposing height, the graceful span; he may add other things and build up a picture of his own which can no longer be described as a copy of the original—the very thing which the average child tried to do unsuccessfully and poorly—but in which the original bridge-picture has suggested some qualities to be used for a design in its own right and in an otherwise independent execution. In other words, the Special, in his representation, succeeds in going beyond pure description and through design, composition, distortion, exaggeration or specific effects of light and shade, achieves sometimes a powerful suggestion of the larger concepts involved.

Moreover, the influence of the picture-slides on the special group is of a subtle nature, as compared to that on the average group where it is rather obvious. Several elements, such as subject matter, composition or technique, will exercise an influence which thus is fairly complex. The fact, too, that a number of the drawings of the Specials is not influenced by content, but by compositional and technical elements shows the difference in observation and application between the two groups. We may venture to say that the Specials think in terms of their expressive means, that is, in terms of picture making and that their observations are directed by this attitude; while the Averages think in terms of subject matter which, by necessity, but not by choice, must be expressed in form of pictures. Thus, the Specials experience in graphic terms, the Averages reduce their experience to graphic terms as an afterthought.

When we compare the picture preferences of both groups we find that boys and girls within the special group have the same taste. This is not so in the average group. With the exception of No. 16, which carries the largest amount of votes of Specials and is a picture which appeals by its conception, composition and technique rather than its content, the choice of the Specials is divided between three pictures, Nos. 8, 9 and 10, all of which are pronouncedly modern in style, unconventional and technically also different from the choices of the average group. There is no doubt that the Specials appreciate and prefer qualities different from those which the Averages like,[9] qualities that do not depend on the subject matter, or if so, are suggestive of an ideology.

A number of Specials, in their first drawings, represented machinery symbolically and this kind of representation increased perceptibly in the second drawing. In this respect a few picture-slides can be considered as indirectly suggestive. It is more probably, however, that, in these cases, the comments acted as suggestions and exercised some influence. The fact that several Specials treated their subject symbolically in their first drawings indicates their tendency to represent, by

[9] See: Lark-Horovitz, Betty. "On Art Appreciation of Children: II", *Journal of Educational Research*, XXXI (1938), p. 596.

graphic means, ideas, a leading thought or even morale, all of which no Average attempts, either because of the conviction that he could not express himself adequately or because he does not connect anything conceptual or ideological with his subject.

The very different attitude of the Specials can be further explained by the difference in facility and variety of representation.

The Special has a far more varied graphic vocabulary. His graphic language is subtle. The average child is characterized by a scarcity of graphic symbols and lack of graphic imagination. The few objects which he is able to represent easily he knows by heart. To change them, even their size, means failure to him. This is the reason for a number of identical or near-identical first and second drawings of the average group, while no such drawings can be found among the Specials. To use a comparison from the field of language: The average child is very clumsy in building his sentences, because his vocabulary is limited and inadequate and because he is ignorant of grammar. The Special has a vocabulary of wide range and knows his syntax. The facility of representation and the wide range of objects which the Specials are able to represent unhesitatingly manifests itself also in the greater diversity of subjects which the Specials represent and the number of drawings representing each of these various subjects (See also Tables I and II of Part I).

Specials cannot be regarded as fundamentally different from average children. This is particularly true of the group under discussion here. Their degree of intelligence, too, is nearly the same. The Specials can be considered as very superior Averages. If so, the attitude, interests and achievements of the specially gifted children can be studied in the light of the objectives toward which average children might be led. This does not signify that an average child can be turned into a Special, but there is no doubt that the difference between the two groups could be reduced by a rise of the standards of the average group. Since one of the principle differences, the developmental status, cannot be changed by instruction, other qualities can be developed such as the growth of graphic vocabulary, comprehension of compositional arrangement and technique, both independent of representational development. Furthermore, through guidance, observational powers and analytical perception can be made more acute, which all add considerably to the benefit which can be derived from works of art.

Summary

Following Part I of this article, in which the change of attitude concerning the content of children's drawings has been discussed, we are dealing here with the influence of a stimulus situation on qualities of an aesthetic nature such as representation, composition, technique or skill.

The experimental set-up consisted in directing 404 children, of age-levels 6 to 15, and 41 specially gifted children, 12 to 15 years old, to make a drawing of machinery with pencil on 9 x 12 paper. After completion of this drawing the children were exposed to 28 picture-slides and comments thereon. A week later the same children were directed in the same way as before to make another drawing on the same subject. They were given the choice of their former medium, pencil, and of a new medium, pen, brush and ink, and of two paper sizes, 9 x 12 and 12 x 18.

Analysis of the drawings showed that the representational status of the younger group is nearly entirely schematic, and that this is also so with nearly half of the older group. Comparison of these results with the norms of the representational status of children of these age-levels show practically no difference. Second drawings do not reveal more than slight differences in this respect; these differences occur only where the new medium has been tried, consist mostly in a regression toward a previous developmental stage and must be attributed to the lack of experience with a new medium.

Only a very few children present their subject functionally, all other children, at all age-levels, present it pictorially. The machinery object which they depict is placed centrally and prominently within the organization of their drawings. The character of their composition is descriptive, without any apparent emphasis on aesthetic aspects.

The influence of the stimulus situation on their second drawings is noticeable in the change of content only and in no other factors, that is, the change of content serves as a record of the fact that one or several picture-slides made an impression, but not of

the elements in the picture which produced the impression.

Younger children are more inclined than older ones to use a new medium or a different paper size. Both treat the new medium in a way similar to the old, familiar medium and hence they fail, the younger children more so than the older ones.

The influence of the stimulus situation on all children is very moderate, that is, children of all age-levels seem little susceptible to the stimulus. It is doubtful, however, whether such a conclusion is justified, since children's difficulty in expressing themselves through the graphic medium may be regarded as a hindrance in showing their susceptibility.

Comparison of average and special children shows a vast difference in the developmental status of representation. No Special is schematic, half of the Averages are; few Averages reach true-to-appearance or perspective stages, almost all Specials do. Advanced development is thus one of the characteristics which distinguish the Specials from the Averages. Yet, no actual change of developmental status is noticeable in their second drawings, in either group. A number of children of both groups, who tried the new medium, show a slight regression, obviously due to the handling of a strange medium.

Nearly all Specials and Averages chose pictorial treatment of their subject (versus functional treatment). There is, however, a difference of compositional arrangement within this treatment. Far more Specials than Averages treat machinery as an accessory in their compositional arrangement, twice as many Specials do so after exposure to the picture-slides, thus showing a kind of observation which is not present in the average child.

Four times as many Specials as Averages change to the new medium. This fact is not due to lack of curiosity on the part of average children but to their consciousness of the fact that a new medium will limit their already limited means of graphic expression, while the Specials are sure of their ability, even with a new medium.

Specials, contrary to Averages, used a smaller paper size and were able to arrange and complete successfully their composition, while most of the Averages, using the larger size, failed. It is clear that the Specials plan their composition and the time needed for its execution while the Averages start without specific plan.

In both groups, most children using the new medium were less successful than they had been with a medium familiar to them. Even so, most of the Specials showed a remarkable insight in recognizing the differences needed in handling the new medium as compared to the old one.

66½% of the Specials were influenced by the stimulus situation compared to 19½% of the Averages. This established beyond a doubt that great suggestibility is one of the characteristics which differentiates the two groups. The nature of the influence, too, is different. Whereas the Average merely indicated his impression by a graphic description of the influencing picture in which he enumerated more or less all that had impressed him, comparable to a list of items, without stress or emphasis on a single factor, the Special omitted or emphasized certain aspects and, through design, composition, distortion or specific technical treatment, suggested the influence of more general or subtle concepts transmitted through the stimulus situation. It may be concluded that the Special observes and thinks in terms of his expressive means, that is, graphic representation, while the Average observes and thinks in terms of subject matter which he necessarily must formulate afterwards graphically, but would not do so of his own accord.

Comparison of picture-slide preference of both groups shows that the special boys and girls agree in their choices and that the special group differs from the average group; that within the average group, boys and girls differ among themselves.

None of the Averages represented machinery as symbolizing an idea. A number of Specials did so in their first drawings and more of them after exposure to the stimulus situation. Averages either do not connect their impressions of the pictures with any ideology or they decide that any representation of this kind is beyond their ability of expression.

Specials have a more varied and subtle graphic vocabulary while that of the average group is poor and unselective. Thus, the Specials' graphic manifestations can be taken with little reserve while that of the Averages must be considered as an inadequate expression of their thoughts and observations.

Appendix I

Used With Machinery Test, 1936

No. of Slide in order used	Name of Artist	Name of Picture and Date	Technique
1.	Unknown: Greek	Steam turbine, 3rd c. BC	Engraving
2.	Unknown	Glass-making, 15th c.	Engraving
3.	Leonardo da Vinci	Flying-machine	Drawing
4.	Unknown	Water-screw	Wood engraving
5.	Michalek	Electric drill	Crayon with highlights
6.	Silovsky	Steam-hammer	Etching
7.	Metzinger (343)	Red bridge	Painting
8.	Blume (363)	Parade	Painting
9.	Lozowick	Factories	Lithograph
10.	Benton	Steel-workers	Painting
11.	Heilborn	Building a bridge	Lithograph
12.	Rethi	Construction of a lock	Pencil-drawing
13.	Rethi	Building of a suspension bridge	Charcoal-drawing
14.	Brangwyn	Building the bridge	Etching
15.	McCrackin	Hudson River bridge	Brush & ink
16.	Cook	Hudson River bridge	Lithograph
17.	Billings (363)	Machine farms; mural	Mural
18.	Lark	Queensborough bridge	Wood engraving
19.	Schaefer	Iron bridge	Color lithograph
20.	Currier & Ives print	Railroad train	Color lithograph
21.	Pennell	Trains that come and trains that go	Etching
22.	Leighton	Canadian Pacific	Painting
23.	Reimer	Century of German railways	Color lithograph
24.	Helck	Poster—press advertisement for Fisk Tire Company	Lithograph
25.	Alexeieff	Night Scotsman	Water color
26.	Cassandre	Etoile du Nord	Black and white lithograph
27.	Turner	Rain, steam, and speed	Painting
28.	German poster	Black Forest	Color lithograph

Specials do not differ fundamentally from Averages, especially not so if their degree of intelligence is approximately the same. They are, in their visual means of expression, superior to Averages. Since their developmental status constitutes the strongest difference between the two groups and since representational development cannot be changed or noticeably accelerated, there is no doubt that an average child cannot be turned into a Special. But study of other non-developmental qualities, such as graphic vocabulary, comprehension of compositional arrangement or techniques, can lead to changes and may be developed with the help of suggestive material or instruction. Therefore, study of the attitude, interests and nature of achievement of Specials, whereinever they differ from Averages may be helpful in raising the standard of Averages and surely worth trying.[10, 11]

[10] I wish to thank Dr. Irving Lorge, Columbia University, for his interest in this manuscript and for his suggestions concerning its arrangement. I also wish to thank Dr. H. H. Remmers, Purdue University, for reading it.

[11] 64 photographs illustrating drawings characteristic for the results described in this article are on file at the Department of Education (Art Ability Research) of the Cleveland Museum of Art and at the disposal of anyone interested in seeing them.

Appendix II

Commentary on the 28 Slides

You all may be interested to see how other people, artists, represent machinery or the like. I am, therefore, going to show you four groups of pictures:

1. Pictures representing machinery, but made in the past.
2. Pictures made by living artists and showing different kinds of machinery.
3. Pictures made by living artists showing especially bridges and the machinery dealing with their construction.
4. Pictures made by living artists showing railroads and all it may involve.

I want you to look at those pictures with three things in mind: *the subject chosen by the artist, what he tried most to impress through this subject, what medium he used, and how he used it to work out both.*

(1) The first picture belongs to the past; it is a steam turbine, and the type of drawing shows the tendency to hide as much as possible of the machinery, which was consid-

ered ugly, unaesthetic by the Greek; therefore the elaborate, animal-shaped legs which support the rotating globe and which are high enough to house a person, necessary to feed the fire.

(2) This drawing about glass-making in the 15th century is a story in several sections, all placed on one picture so as to see it all, showing minutely the tools and how the men —who in this instance take the place of now-a-days machines—handle them. The arrangement, though decorative, is made to show clearly every detail. The sharp-point technique is an adequate help.

(3) These sketches for a flying-machine are much less clear, yet far more suggestive; they are not intended to be a picture, but a note in pictures, something to be remembered when it comes to more intricate engineering drawings.

(4) This next picture was made in 1548 and has foremost in mind the utility of such a waterscrew and the way it is used. Therefore, note the details, such as the threads of the screw, and also the setup in the background, which in this way puts two pictures on one page. The line technique which is used helps for a clear picture.

Let us look at some machinery pictures of now-living artists, or artists who lived still when your parents were quite young.

(5) Here are the sketches of an electric drill. This machine is used to bore holes into hard stones or rocks. You can see it in operation when houses are built on rocky ground. The utter clearness of the construction is achieved by handling the pencil without smudging, by using a neutral paper and highlights, and most of all because the artist had studied its construction and knew this drill so well that he could draw it frontwise and sidewise with every screw and pin without ever making a mistake.

(6) This etching of a steel-hammer plant is on a different order. You could not learn anything of the machinery itself through it, but you get an impression of how it looks, how people work and may feel in it, of the smoke and blazing heat and noise. The artist used the contrast of large black and whites; he used a needle, yet he also used a chemical with which he can make the sharp lines shade into each other.

(7) Here is a painting of a factory from the outside. No heat, soot, smoke, and blazing lights; but the clean, purposeful construction: machine alone—no life; and to show this up more, the trees even are bare and simplified. The smooth technique is another help to produce this effect.

(8) This modernistic painting parades all sorts of our modern machine life. The idea here is to show a great variety of machines and of what machines are built, yet to show the lack of ornaments and frills in all of them, their stern achievement of the necessary. The technique does the same: smooth colors, uniformity in line, in the massing of light and shade.

(9) Not so with this picture. The simplicity of lines is maintained. Unnecessary details are omitted. But the effect of smoke, of the exclusion of nature,—as the lights come from the blaze inside—of the dreariness, yet greatness of this man-made machinery is put forth; and the technique of soft crayon is used to work out the sooty effect of smoke and dirt and darkness.

(10) Here is a quite different type: here men are in the fore. They and the machine are one. They are equally strong; man needs the machine, and the machine needs man. This is brought out by the artist in making the men look strong, finely built, and the machines clearcut and beautiful in design, and by letting the natural light and the sky permeate the whole.

(11) We turn now to a group of bridge-pictures. This first one, a pencil sketch, stresses the construction. You get a pretty good idea of how this structure is being made, what kind of helping machinery it needs. The actual construction is on the mind of the artist, and he leaves out anything that would draw your attention away from it. Therefore, the clean line technique.

(12) This pencil drawing of a structure for a concrete lock is purposely taken from a high viewpoint. The main impression is that of great height and the entanglement in the depth when digging the water canals, moving dirt and drainage. This has been achieved by making a bird's-view perspective and using a fine-point technique, as well as by keeping away from large pools of darkness.

(13) This picture, a charcoal drawing by the same artist, conveys a different impression: strength, solidity, massiveness, safety. The suspension tower is put forth as the main part; this arrangement helps the effect. The

heavy medium, the blackness and solidity of the lines are other successful helps.

(14) This etching makes use of deep shadows melting into each other. Yet the constructive points of the bridge are put forth, but also men, the people who work on the bridge, who pass the bridge, who have some kind of business under the bridge. Again we have the close connection between man and machine; motion, helped by a technique of flickering shadows.

(15) This brush-and-ink drawing is on a different order. The artist, an architect, wants to make you see the line silhouette, the design of the structure. He therefore omits any shading; it is black against white, without much detail, yet you think of all the detail involved.

(16) This same Hudson River bridge looks very different to the mind of this artist. The construction is finished; we see no more machinery, but this lithograph is suggestive of the machinery which made the bridge. The lines are clean, almost shiny, as is the steel, the bridge is made of. No man—the machine conquered the stream.

(17) And here, a pure picture of machine, it is almost an engineer's draft as to technique. But the arrangement and treatment brings forth the idea. Machine-part builds another machine-part. Man who devises it is invisible, like a God, where machine is his creature.

(18) This bridge in New York only suggests the machinery, with the exception of the cranes and loading ships in the background. This wood-engraving achieves its effect by the purely structural foreground of the bridge and because every detail is or hints at machinery. Black and white are used to bring out this machine effect and nothing else.

(19) The last bridge picture is a German poster, also showing what machinery has achieved, and not the machinery in itself. Only modern methods of working steel can build such a bridge; therefore, the artist shows this up, and the perspective view from underneath is another help to make you conscious of it, and make it conspicuous.

Let us look at the fourth group of machinery pictures of which I spoke: the railroad.

(20) Here is a color print. The colors do not show. They are very gay. At the time of this print, which was an advertising, people were afraid of the railroad. Therefore, picture advertising tried to make a pleasant impression of machine. People could feel confident about it. This is achieved through the neat drawing, the pleasant landscape, the gay colors.

(21) Not so with this etching of a station. Here the proportion of the hall, with its steel structure filled with smoke and steam, conveys noise, something overwhelming. The smallness of the people and even the trains make this still stronger. So does the far-reaching perspective. The technique again works with engulfing blacks, wavering lines, and pools of light.

(22) Here is a poster of a railroad. The engine is the main part of the picture, not only because of the central arrangement, but because of the size, the darkness against the background; even the mountain suggests a comparison—a parallel between the might of nature and the might of machine. Here the variety of shading in the oil paint helps to break a possible monotony and bring out the one big mass in the middle, the engine.

(23) Another poster, but besides the idea of advertising the railroads is the idea of showing the ingenuity of mankind. The speed of the figure makes you think not only of what has been achieved, but of what is going to be achieved. So does the size of the figure compared to the machines. The arrangement combined with the sizes achieves the effect.

(24) This poster has allegoric as well as symbolic meaning. The allegory lies in the suggestion of the modern machine necessary to carry the goods from the factory to the places where they are needed. The wheel, the only thing shown of the railway, looming dark and large in the foreground, means speed, the perpetual movement. The effect here is brought out through contrast and detail of the wheel.

(25) And here is an advertisement of the Flying Scotsman, the pride of the English, because of its speed and comfort. It is a very different effect: the machine here looks friendly, comfortable, and cheerful. This is effected by the scenery, the lovely moonlit night, the mountains and lakes of Scotland moving by, the delicate transparent water-color technique.

(26) Here is a French artist. You might call him thrifty in his drawing. He only puts down the most necessary things to give you the idea. But how well he does it! The rails seemingly stretching into eternity impress you with the endless miles a train speeds through; the switch suggests the different parts of the world. It is machinery too, because without rails there is no railway, just as your left hand helps necessarily your active right.

(27) And now a suggestive picture, an oil painting. The railroad, the engine, the machine, in fact, is only an excuse, or a new sensation for this artist to paint what he is most interested in: effects of light through the rain and fog. The train and its lighted eye are only a help, a means, for this effect.

(28) This last picture is another German poster. The idea is the same as in the picture before, different though they be. You are shown the beauties of the Black Forest by looking through the lofty bridge. The train only suggests that you might see all this by going on it. The arrangement and the bright clean colors are a helpful technique. Yet this picture impresses you because of the idea suggested through bridge and train, that all this is only possible through our modern machinery.

A SURVEY OF THE SOCIAL DEVELOPMENT OF THE 10TH, 11TH, AND 12TH GRADE PUPILS IN A SMALL HIGH SCHOOL

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The immediate purpose of this study was the application of two personality scales to the 100 members of the three upper classes in a small high school in order that the social development of the pupils might be studied in comparison with that of other and similar pupils elsewhere. The secondary purpose was the functional one of finding pertinent material which would serve in the formation of plans for the school and the community which might lead to better personality development in the pupils, since it was the belief of these writers that these pupils as a group showed a lack of initiative in planning future events and a deficiency of aggressiveness in doing the things which they did undertake.

The two scales chosen out of the dozens of somewhat similar personality rating scales for use in this study were the Hayes "Personality Rating Scale for the Adolescent in School" and the Doll "Vineland Social Maturity Scale". The Hayes Scale was chosen because it was based upon actual observation of adolescent pupils in school and because it had been tested in school situations by its author. The Vineland Scale was chosen for its greater objectivity, because it measured social knowledge in a manner different from the Hayes Scale, and because its wide use furnished an excellent means of comparison of the pupils in the local school with other more or less similar groups involving large numbers of pupils.

The reliability coefficient of the Hayes Scale, obtained by the author from an odd-even check of 100 papers, was $+.88 \pm .015$. This became $+.94$ when the Spearman–Brown formula was applied, according to Hayes. A statement of the reliability of the Vineland Scale was not found by the writers beyond one in which it was said that the reliability of the scale was high.

The Hayes Scale consists of 100 items grouped for diagnostic purposes under the following eight headings:

(a) relations to others generally
(b) respect for the rights of others
(c) relation to the teacher
(d) relation to the other pupils
(e) initiative
(f) health habits
(g) general interest
(h) scholarship and study habits

These are to be used in the analysis of pupils' personalities by rating pupils as "T", "F", or "U" on each item, that is, as satisfactory, unsatisfactory, or unknown. A table is supplied by the author by means of which these letters can be converted into number scores.

The Vineland Scale provides a detailed list of activities and ideas in which children generally show a progressive capacity for looking after themselves and which indicate progressive ability for participating in those activities which lead to ultimate independence as adults. The items of the scale are arranged in an order of increasing difficulty and represent maturation in general self-management, self-direction, locomotion, occupation, communication, and social relationships. This general growth from immaturity to social responsibility is used as a measure of individual development in social competence. The 117 items of this scale are separated into year groups, from which a social age score for a pupil's whole performance may be obtained. The norms extend from chronological age 10 through to the adult years. The Vineland Scale is more dependent on factual knowledge about the pupils than on opinion or personal rating. In using both scales in this study, the average judgments of three people who had known all of the pupils for several years were employed.

The chronological ages of these pupils ranged from 15 to 20 years, with a mean age of 17.09 ± 1.19 years. Their mental ages, obtained from the Otis Self-Administering Test of Mental Ability, Higher Examination, Form A, ranged from 14 to 20 years, with a

mean of 16.87 ± 1.36 years. Their IQ's ranged from 82 to 123, with a mean of 101.62 ± 9.52.

The Hayes scores on these 100 pupils extended from +974 to —125, nearly the range of the scale. The higher positive scores represent the more desirable personality trait performances or social development. The mean Hayes score for the 43 girls in this study was 653.9 ± 192.0. This is located on the 76th percentile of the Hayes norm. Hayes does not give a table of norms for girls alone, but does state that the median score for girls which was found by her and her associates was 553. The mean score for the 57 boys in this study was 640.9 ± 194.0. This is located on the 73rd percentile of the Hayes norms. The median score for the boys rated by Hayes was 448. The mean score for both boys and girls in this study was 646.5 ± 192. This is located on the Hayes 73rd percentile. The median score for both boys and girls found by Hayes was 507. The difference between the central scores found by Hayes and by the writers was .73 of a standard deviation from the mean which was found by the writers. The Hayes score was in a lower direction or toward the less desirable scores. The only reasons which the writers can find for this are that: (a) the local group was rated too high; or (b) the local group was less selfish and aggressive and less antagonistic toward school and toward other people than the group rated by Hayes, i.e., less "sophisticated". In one respect it would seem that the difference should have been in the opposite direction from the one which was found. Hayes states that older pupils, both boys and girls, are likely to make lower scores than younger pupils. The range of chronological ages for the local group was 15–20 years inclusive, while Hayes' group ran from 10–20 years inclusive.

Hayes does not give any tables of norms for the eight diagnostic parts of her scale. The writers worked out tables for each of these parts, showing the means and standard deviations for the boys and for the girls and for both combined in each of the grades studied. The pupils in the local study rated above the medians of the ranges of scores given by Hayes on all of the eight diagnostic parts of the scale except "initiative" and "general interest". This is believed to be due to the unstimulating home conditions and the local environment of this group of pupils, that is, a somewhat self-centered and "retreating" village community. The community is one in which the tendency of the adults is toward extreme conservatism.

Data from the Vineland Scale are easily reduced to social quotients or S.Q.'s for purposes of comparison. These S.Q.'s are similar in the social measurements to IQ's in the mental measurements. The average S.Q. of large groups should be around 100. The mean S.Q. for the pupils in this study was 98.75 ± 8.14; and the group was therefore normal, as measured by this scale. The mean S.Q. for the 57 boys was 100.37 ± 6.4 or slightly higher than the one for the 43 girls whose mean S.Q. was 99.32 ± 1.8. The standard deviation for the boys was noticeably larger than that for the girls, however.

All of these pupils completed the first items of the Vineland Scale, but many failed on the 98th item and those above. The 98th question involved having a job or planning to continue in school beyond the high school. Only a small per cent of the local pupils will go to any college since the town has no occupations that encourage pupils to do this. Most of these pupils will remain in or near their home town after they leave high school—if they do as the older pupils in recent years have done. While these pupils are still in high school the question of employment is beyond their control and, therefore, almost entirely outside of their immediate plans.

The total scores on the Hayes and the Vineland Scales for the individual pupils in this study did not run particularly parallel. The writers did not find a correlation index for these pupils on the two scales. The social quotients and the intelligence quotients of the pupils do run quite closely parallel, with the exception of a few cases. The differences in these cases seem to be due to identifiable special circumstances, such as a marked physical handicap or having more responsibility than usual in the home as the result of the loss of one or both parents. The mental ages and the social ages vary only slightly among the pupils, but the mental ages and the Hayes scores are farther apart. This is not taken to mean that the S.Q.'s represent the same things as the IQ's but rather is taken to be an accidental situation.

The applications of the results of this study to the pupils lay in two fields. The use of

these scales caused the adults working with these pupils to be more objective and analytical in their counselling work with the pupils. When the pupils found that they were being measured on scales, they paid more attention to their behavior as the expression of their personalities. After the ratings had been made, items of similar behavior to those in the scales were studied with the pupils. This caused the pupils to think more seriously than they had done before about their behavior. A few of the pupils with the lowest scores were shown the ratings which they had received. In all of these cases, this had a valuable stimulating influence because the pupils were somewhat shocked to find the ways in which they appeared to others whose good opinions they desired. None of these pupils showed resentment or dismay. Some of them were allowed to rate themselves although these ratings were not used as part of the data of the study. This, too, had a valuable effect. The writers believe that, if all of these pupils were rescored today, they would score considerably higher than they did on the first measurement.

Conclusions

1. Such personality rating scales or social knowledge scales as these are useful in making the study of pupils more objective and analytical.

2. The items in the Hayes Scale are quite subjective in the way that ratings are given and are difficult to use with any feelings of certainty. They do give analytical information whose parts and whose total should be more valuable as measures of development than a judgment based on a single rating.

3. The emphasis in the Hayes Scale on pupil eagerness to do things to please the teacher under the heading, "relation to the teacher", seemed to the writers to be too great. Such activities can easily be calculated self-seeking.

4. Neither scale dealt specifically with the moral development of the pupils.

5. The pupils' IQ's were not closely parallel to the Hayes scores, but were quite parallel to the Vineland S.Q.'s.

6. The pupils with low scores on both scales came almost uniformly from homes which furnished poor environmental conditions.

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THE ADMINISTRATIVE CURRICULUM AS EVALUATED BY BOARDS OF EDUCATION

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This report is a continuation of a series of research reports dealing with the superintendent in relation to his professional environment and his preparation for the duties of his office. These reports deal with the superintendent's professional background,[1] his major and minor fields of specialization,[2] the requirements and offerings concerning the requirements of state departments of education for administrative certificates,[3] and the curriculum offered superintendents by institutions of higher learning.[4]

The check list of which the 16 main divisions are used in Table I was designed for use in surveying the divisions and subdivisions of educational administration offered for study by institutions of higher learning. It was slightly revised and sent to superintendents for the purpose of surveying the parts of the field formally studied by them. For use in the present report, it was again slightly revised and mailed to boards of education in order to determine which fields they consider as important for their superintendent to have studied. There were 124 subdivisions in addition to the 16 main divisions. The sampling was from the states of Nebraska, Colorado, Wyoming, and Utah. These data are shown in Table I. The odd numbered columns of this table show the per cent that the recommended items are of the total returns from the questionnaires. There were 474 check lists mailed to presidents of these boards and 160 reports received from them. The number of check lists received is 33.8 per cent of the total number of lists mailed.

This report shows that the per cent of board members recommending the topics representing divisions of the check list for study is slightly greater than the per cent of superintendents who have studied these divisions.[5] Those school board members, who reported, show a very favorable reaction to the general divisions of the list. Probably the chief reason why many of the board members did not send in the completed check list is due to the fact that this group is ill informed concerning the formal preparation of the superintendent for his work.

The average of the 16 main divisions of the check list as shown in Column 11 is 72.2 per cent. That is, this per cent of the reporting board members recommended that their superintendents study the subjects shown in the list. Some of the board members, who did not complete the list, frankly admit that the items were beyond their comprehension. However, it must be remembered that this was an extremely long check list.

The president of a high school board in Wyoming makes the following frank remarks:

> "If I wanted to be a school superintendent or any other professional man, I would study everything along that line that was within my reach and, then after all this, I realize that I might well be a failure. If it isn't in one, then, I just am not, and this goes for everyone."

A Nebraska board member believes that a superintendent ought to recognize "that the goal to be attained is individual student development rather than regimentation or rather the careful balancing of the two ideas." He is convinced that the superintendent "should recognize the value of being always helpful but refusing to become the community leader, which so often leads to stepping on certain groups or individuals and thereby embarrassing the board of education." . . . "The school should be strictly non-sectarian and if public relations become an issue, these

[1] Moore, Clarence Carl. "The Superintendent's Professional Background," *School Executive*, LX (January, 1941), pp. 26, 27.

[2] ——. "Majors and Minors for Superintendents," *School Executive*, LX (March, 1941), p. 17.

[3] ——. "Superintendent's Certificates," *Nation's Schools*, XXVII (February, 1941), pp. 49–50.

[4] ——. "The Offering in School Administration." *Educational Administration and Supervision*, XXVII (June, 1941).

[5] Moore, Clarence Carl. "An Evaluation of the Curriculum Offered School Superintendents by Institutions of Higher Learning." Unpublished Doctor's Field Study, No. 3. Colorado State College of Education (1940), p. 91.

TABLE I

THE FREQUENCY WITH WHICH THE ITEMS INCLUDED ON THE MAIN DIVISIONS OF THE CHECK LIST IN EDUCATIONAL ADMINISTRATION WERE RECOMMENDED BY BOARDS OF EDUCATION FOR FORMAL STUDY BY SUPERINTENDENTS OF SCHOOLS IN THE STATES OF COLORADO, NEBRASKA, WYOMING, UTAH AND FOR ALL FOUR STATES: AND THE PER CENT THAT THESE ITEMS ARE OF THE TOTAL NUMBER OF RETURNS FROM BOARDS OF EDUCATION: 58 COLORADO REPORTS, 60 NEBRASKA REPORTS, 58 WYOMING REPORTS, 14 UTAH REPORTS, AND A TOTAL OF 160 REPORTS, 1940[a]

Main Divisions	States: Colorado		Nebraska		Wyoming		Utah		Total	
	F	P	F	P	F	P	F	P	F	P
	2	3	4	5	6	7	8	9	10	11
I. Federal Relations to Education	44	75.9	34	56.7	22	78.6	10	71.4	110	68.8
II. State Control of Education	53	91.4	47	78.3	25	89.3	10	71.4	135	84.4
III. County Educational Organization	46	79.3	38	63.3	20	71.4	14	100.0	118	73.8
IV. Local Units of Organization	33	56.9	35	58.3	20	71.4	12	85.7	100	62.6
V. The District Board of Education	44	75.9	42	70.0	22	78.6	13	92.2	121	75.6
VI. The Superintendent of Schools	50	86.2	42	70.0	25	89.3	10	71.4	127	79.4
VII. Educational Organization	46	79.3	42	70.0	24	85.7	14	100.0	126	78.8
VIII. The Teaching Staff	47	81.0	43	71.6	22	78.6	12	85.7	124	77.5
IX. The Administration of Pupil Personnel	50	86.2	44	73.3	24	85.7	14	100.0	132	82.5
X. Business Administration of Schools	47	81.0	44	73.3	22	78.6	13	92.9	116	72.5
XI. The School Building Program	48	82.8	43	71.7	19	67.9	14	100.0	124	77.5
XII. Standards in School Buildings	31	53.4	29	48.3	19	67.9	10	71.4	89	55.6
XIII. Care of the School Building	46	79.3	45	75.0	19	67.9	14	100.0	124	77.5
XIV. School Building Insurance	32	55.2	30	50.0	16	57.1	13	92.9	91	56.9
XV. School Supplies	47	81.0	44	73.3	23	82.2	14	100.0	128	80.0
XVI. Transportation	31	53.4	22	36.7	19	67.9	11	78.6	83	51.9
Average of the main divisions	43	74.1	39	65.0	21	75.0	12	85.6	116	72.5

[a]Cuts showing the plan of the check list are exhibited in Figure 1. There were 16 main divisions and 124 subdivisions to be checked. The subdivisions have been eliminated from this table in order to make it brief.

should be tactfully referred to the board of education."

A Wyoming president strongly praises his superintendent's preparation in the following statements:

"In other words, Mr. Moore, a superintendent should know something about nearly everything you have on your list to make a good one. We have just recently completed an extensive-new addition. Our superintendent was almost entirely in charge of construction. These various accomplishments (the check list ones) make him almost invaluable. The right kind of a superintendent properly educated is like a man who takes over the operation of a business. He may have a board of directors but, after all, he is the goat."

Another Nebraska president offers the following advice and suggestions concerning their own situation:

> "We do not want a man who has been too much of a public leader to the extent that school is a side line. Such a thing is getting too many irons in the fire just to be popular with the result that the school suffers. Too many superintendents are poor financiers. Since they are spending someone else's money, it is too hard to say 'no!' "

The president of a board of education in Utah found the list helpful in evaluating the preparation of his superintendent. He writes:

> "It seems that the list of questions covers practically all the phases of school administration and management. I consider them all of importance in the selection of a superintendent. They have been taken into account in the retention of our present superintendent."

The following comments from a Colorado president probably more nearly expresses the present practice of most boards of education concerning the selection of a superintendent:

> "The general training of a candidate is considered. It is difficult to determine how much training in a specific branch is taken into consideration."

This man has been the president of his board for 15 years and a member of it for 25 years. He writes as follows:

> "Our chief factor and consideration in selecting a superintendent in these times when school receipts have a tendency to shrink has been the business administration of the schools: the selection of a superintendent who keeps the school expenses within the range of probable receipts; the organization of the school on as economical a basis as possible, taking into consideration the necessity of properly educating the children, and the elimination of 'frills' not of reasonable value to the pupils.
>
> "We also want a man of good educational background and of strength of character to insist on proper discipline of BOTH teachers and students, and these factors are the strongest in dictating the selection of a man to superintend our schools . . .
>
> "We have come to the conclusion also that manual training is of little value to the children these days. It possibly benefits a proportion of the students but only such a small proportion as renders it an unjustifiable expense. We try to confine ourselves to courses which are of the greatest value to the greatest proportion of the students."

The above letter is from a member of a board of education in a city where there is a teachers college and whose schools enroll 421 elementary school pupils and 454 secondary school pupils.

There are many, many members of boards of education who would disagree with this one concerning what constitutes the "frills" of a school curriculum. However, he has every right to his own opinion and the expression of it.

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